A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

January 10, 1952

UNIV. OF MICHIGAN

ENTS PAGE 2

JAN 11 1952

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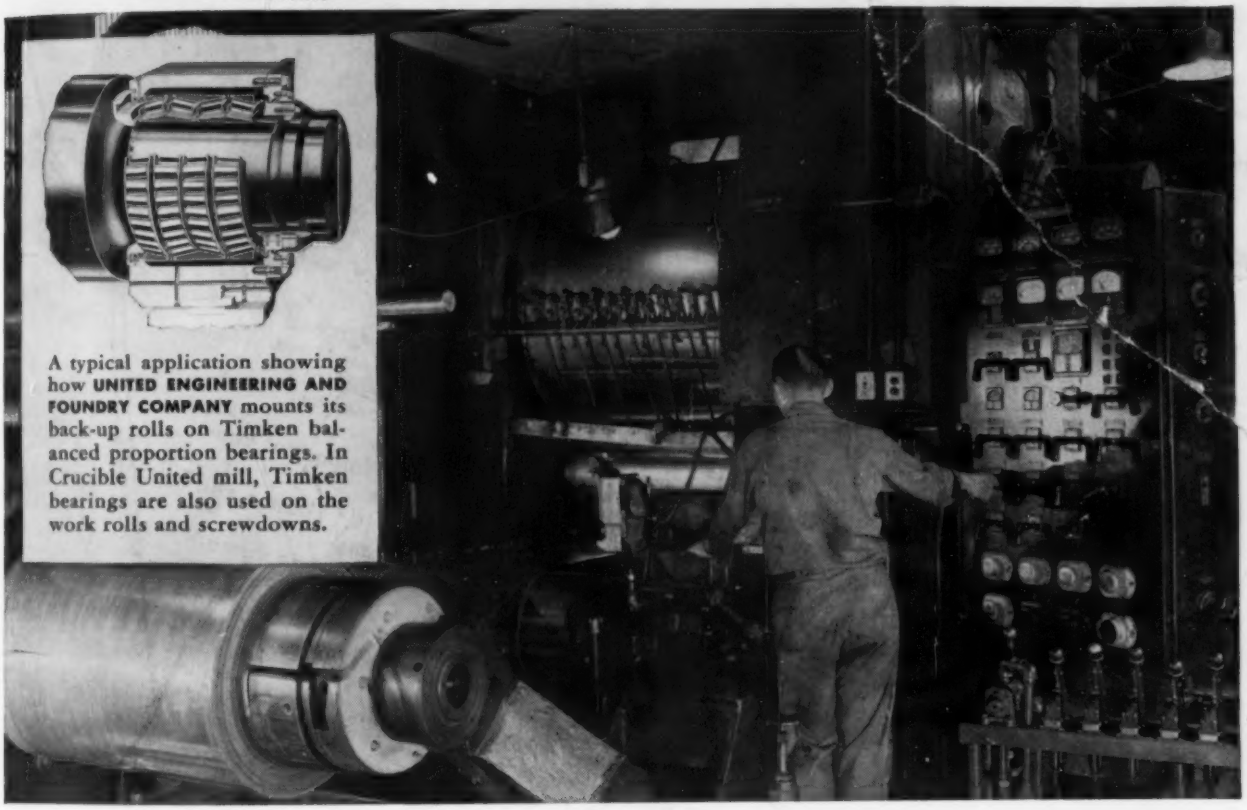


A typical application showing how **UNITED ENGINEERING AND FOUNDRY COMPANY** mounts its back-up rolls on Timken balanced proportion bearings. In Crucible United mill, Timken bearings are also used on the work rolls and screwdowns.

How TIMKEN® bearings back up a back-up roll

THIS United 54" four-high reversing mill is rolling 38½" wide sheet type 302 stainless steel at Crucible Steel Company's Midland, Pa., plant. To help it stay on the job day after day—with a minimum time-out for maintenance and repair—its back-up rolls are mounted on Timken® balanced proportion bearings. Timken balanced proportion bearings on the back-up rolls provide greater mill rigidity because they permit larger diameter roll necks than standard roller bearings. Load ratings are increased up to 40%, roll neck strength upped 50 to 60%.

Timken bearings on work rolls and back-up rolls eliminate complicated lubrication systems, permit the use of simple and economical grease lubrication. Rolls can be changed quickly and easily. No special thrust bearings are needed because Timken bearings take radial and thrust loads in any combination. And due to their true-rolling motion, and incredibly smooth surface finish, Timken bearings reduce roll neck friction. Smoother starts and stops of mills on Timken bearings prevent the loss of steel.

Over 50 years of bearing research and development have made Timken bearings first choice throughout industry. Specify them for roll necks on new and existing equipment. For full information consult our roll neck bearing specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊂⊃ AND THRUST →⊂⊃← LOADS OR ANY COMBINATION

Driving a Goodman belt conveyor, this Speedaire unit, only 26" high, clears the ceiling with room to spare. As indicated by the white outline, the standard reducer required to do this work is of much greater frame size.

SPEEDAIRE conveyor drives save $4316

ALL haulage at the Peters Creek mines, underground and above, is by belt conveyors driven by Speedaires. By installing this powerful fan-cooled drive instead of a conventional worm-gear speed reducer, the coal company saved three ways:

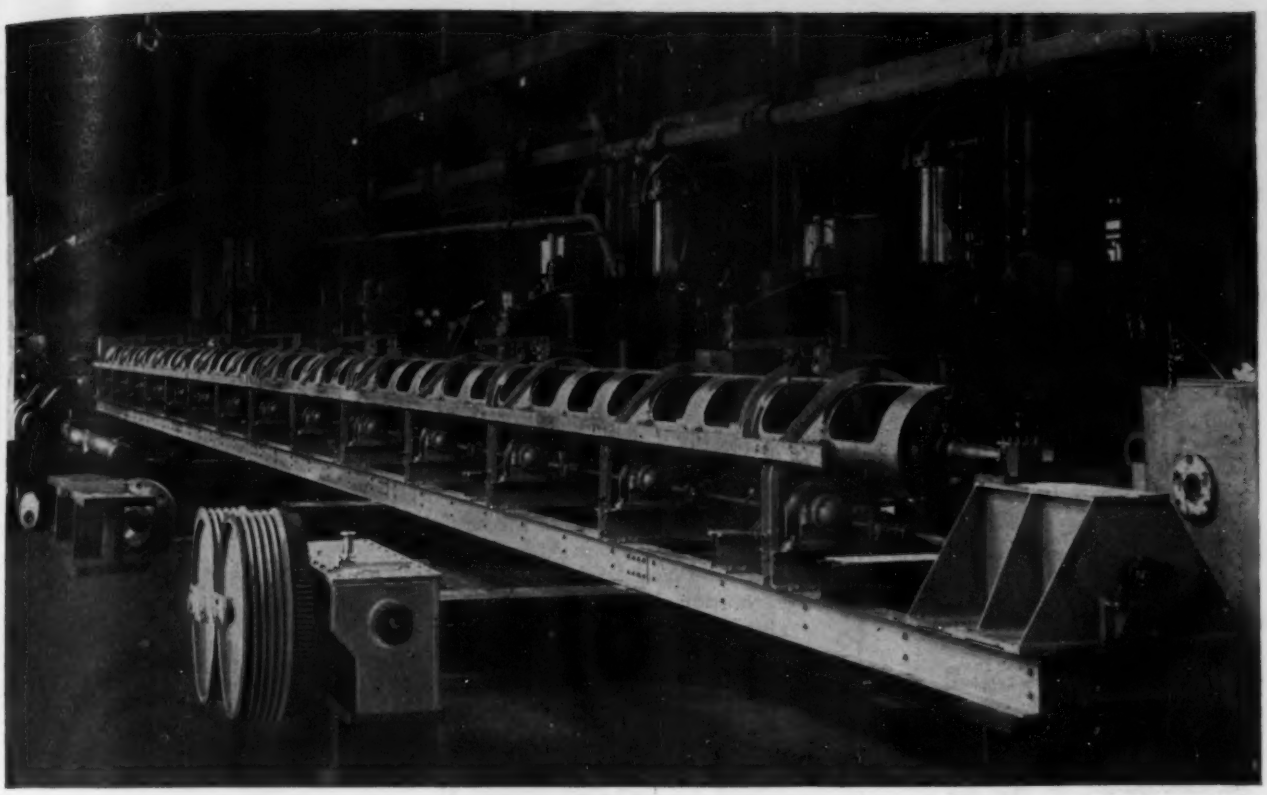
1. *Weight saving*—700 pounds per unit—an important consideration on mining equipment.
2. *Space saving*—Speedaire is 11" lower, 6½" shorter and 4" narrower, permitting use in thinner seams.
3. *Cost savings*—Speedaire averaged $616 less than a standard unit of comparable capacity. On 7 drives installed on conveyors below and above ground, the saving was $4316.

Cleveland Worm Gear Speed Reducers have been serving the coal industry for more than a quarter century, operating conveyors, shuttle cars, hoists, picking tables, separators, elevators, jigs, shakers, dryers, loaders and other equipment —wherever a powerful, trouble-free, right-angle drive is desired. Wherever they serve, coal men know from experience that they can depend on Clevelands for satisfactory, continuous service, no matter how severe the conditions.

Write for the new Cleveland catalog. The Cleveland Worm and Gear Company, 3252 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers



Stranding Machine built largely by *WELDING*

These fabricated bed plates and tubular members are for use in a 41-spool wire-stranding machine. They form an assembly 105 ft long, 3 ft, 8 in. high, and 3 ft, 5 in. wide, weighing 37,055 lb. The greater part of the assembly was produced by welding.

If you are a builder of machinery—any kind of machinery, large or small—it will pay you to look into the possibilities of Bethlehem Weldments.

We have had years of experience in turning out all kinds and sizes of weldments, and our shop is well equipped for bending, forming, flame-cutting and stress-relieving operations.

If you'd like to discuss weldments in detail, call in a Bethlehem man by contacting the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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The steel used in Bethlehem Weldments can be bent, pressed or otherwise shaped prior to welding, without harm to its physical structure.

CAN BE COMBINED WITH FORGINGS OR CASTINGS

Although Bethlehem Weldments are often used alone, they can be combined effectively with either forgings or castings.

BETHLEHEM STEEL

BETHLEHEM WELDMENTS

IRON AGE

JANUARY 10, 1952
VOL. 169, No. 2

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DIGEST

of the week in metalworking

PAGE 35 **HOT-TOP STEEL DEMAND STRAINS SUPPLY**

Steelmakers once more faced with the defense need to make better carbon steel are finding that hot-topping facilities are being strained. Demand for hot-topped ingots is increasing. Special materials handling and pouring steps in producing the ingots are causing the supply bottleneck.

PAGE 38 **COCKY USW DENOUNCES STEEL INDUSTRY**

Theme of the United Steelworkers of America Atlantic City meeting last week was distrust and ridicule of the steel industry. Union chief Murray and delegates turned the meeting into a "hatefest." The convention was cocky and self-assured. Mr. Truman's plea delayed a strike.

PAGE 39 **WHY FAIRLESS REJECTED UNION SPEECH BID**

Benjamin Fairless, U. S. Steel Co. head, turned down a steelworkers union invitation to speak on his stand of no price rise, no wage hike. Published stories that had him haggling on what questions could be asked are wrong. The real reason behind the rejection was that a speech was futile.

PAGE 40 **PUSH DOWN THROTTLE ON TRUCK OUTPUT?**

Although truck production enjoys high Washington esteem as a hauler for defense, a heavier switchover to military vehicles could crowd some output off assembly lines. But truck production so far has been getting a better break from NPA than other items. Truckers plead for better roads.

PAGE 60 **CUTBACK HOWLS ECHO LOUD IN DETROIT**

While auto industry representatives were in Washington protesting proposed cutbacks in production, the folks at home (Detroit) echoed the vehement arguments. Both industry and management presented bitter arguments against the cuts. A Jan. 12 U. S. decision is now awaited.

PAGE 65 **WESTERN SCRAP BALING CAPACITY GROWING**

Installation of new presses has been spurred by OPS action naming the bundle as the base for steel scrap prices. There is growing interest in street car rails as a scrap source but high repaving costs are a drawback. Explosives in overseas military scrap steel are proving dangerous.

PAGE 67 **TOOL USERS PUT STRESS ON PRODUCTIVITY**

What do users of machine tools want in their equipment? Further results of a survey conducted by the Society of Tool Engineers indicates that users emphasized increased productivity. One complaint was that machines must be shut down for too long. Another was operating speeds.

PAGE 77 **THE APPLICATION OF FLEXIBLE COUPLINGS**

A wide variety of flexible couplings is available for various misalignment problems. Such couplings are not universal joints, will not correct serious angular or parallel misalignment. So machines should always be lined up as accurately as possible, unless slight shaft float is desired.

PAGE 81 **USE BORON IN NORMALIZED HEAVY SECTIONS**

English practice uses boron to strengthen heavy alloy steel sections in the normalized and drawn condition. In work at United Steel Co., Ltd., low-carbon, low-alloy steels with varying amounts of boron in the presence of molybdenum have improved ultimate tensile stress and yield stress.

PAGE 86 **SPECIAL CONTROLS FOR BIG BORING MILL**

Allis-Chalmers' new 30-ft boring mill has special controls which make it flexible and versatile. Table speeds and head feeds have unusual range, for turning, boring, and milling. Heads may be operated independently, or synchronized electrically to put both tools on same cut.

PAGE 107 **STEEL PEOPLE SEE SOME PRODUCTS EASING**

Although evidence so far is spotty, some steel people see pressure for certain products easing noticeably before the end of the second quarter. In addition to cold-rolled sheets, products mentioned include silicon sheets, mechanical tubing and some stainless types. A selling job looms.

NEXT WEEK **QUENCH-TEMPER TREATING OF NODULAR IRON**

Nodular irons require at least one-half hour at 50°F above critical temperature range. Predominantly ferritic structures may require longer or higher-temperature soaking. Tempering at 1000°F produced 142,750 psi tensile strength with 290 Bhn hardness in a 3.10 pct carbon composition.

Performance data, based on production experience, available upon request from authorized firms or individuals for heat treating any of the following items:

NEUTRAL HARDENING

☐ AIRCRAFT landing gears ☐ propeller gears ☐ propeller hub parts ☐ shafts ☐ drag links ☐ piston rings ☐ engine parts ☐ supercharger parts ☐ engine cylinder liners, etc.

☐ TANK piston rings ☐ cylinder liners ☐ engine exhaust valves ☐ engine cam shafts ☐ gears, etc.

☐ Armor piercing shot and caps
☐ Armor plate ☐ Land mine parts
☐ Jet engine bearing races

DRAWING

☐ AIRCRAFT gas turbine gears ☐ landing gears ☐ piston engine parts ☐ supercharger parts, etc.
☐ Armored vehicle gears & pinions
☐ Armor piercing shot
☐ Tank torque converter parts
☐ Land mine parts
☐ Shells (cold extruded) ☐ cold drawn
☐ Tank tread pins

SOLUTION HEAT TREATMENT OF ALUMINUM

☐ Sheets and stampings ☐ airframe parts ☐ rivets ☐ plane rudders ☐ engine cowls ☐ helmets

ANNEALING

☐ Shells—cold extruded or cold drawn
☐ Cartridge cases—brass or steel
☐ Copper rotating bands
☐ Jet engine compressor parts ☐ silver lined bearings, etc.
☐ Aircraft engine connecting rods

AUSTEMPERING

☐ 3.5" bazooka motor bodies
☐ Rocket motor bodies
☐ Automatic pistol parts
☐ Base detonator fuses
☐ Bomb nose fuses
☐ Aircraft & tank piston rings
☐ Bomber plane brake shoes
☐ Spring clips

CYCLIC ANNEALING

☐ 3.5" bazooka motor bodies
☐ Shells (hot forged)

CARBURIZING

☐ Aircraft gas turbine gears
☐ Tank bogie wheel parts
☐ Tank engine gears
☐ Aircraft piston engine parts
☐ Aircraft camera parts
☐ Armor plate
☐ Gun breech block parts

MARTEMPERING

☐ 20-mm machine gun parts
☐ 40-mm Bofors gun parts
☐ Tank engine camshafts ☐ engine gears ☐ armor plate ☐ torque converter parts ☐ tread pins, etc.
☐ Aircraft gas turbine gears ☐ clutch rings
☐ Armor piercing shot
☐ Rocket fuse bodies

HEATING FOR FORGING

☐ 3.5" bazooka motor bodies
☐ Shells (hot nosing)

DESCALING

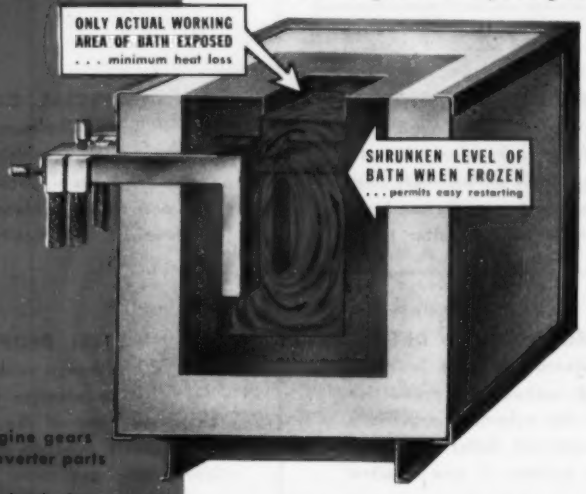
☐ Aircraft gas turbine buckets
☐ Stainless aircraft engine parts
☐ Inconel aircraft engine parts

Check

YOUR HEAT TREATING PROBLEM FOR NATIONAL DEFENSE

. . . AJAX Has the Answers!

4 out of 5 metal products for defense use can be heat treated better, faster, with less floor space and at lower cost with an Ajax Salt Bath Furnace than by any other method! This statement is proved by the widespread use of Ajax furnaces during World War II and by the even more marked trend toward this exclusive salt bath method in today's rearmament program. And we'll be glad to prove it *specifically* by heat treating specimen batches of your materials under actual shop conditions in the Ajax Metallurgical Service Laboratory. There is no obligation on your part. You be the judge!



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AJAX ELECTRIC SALT BATH FURNACES

The Iron Age
FOUNDED 1855

Here We Go Again

WE are now well on our way to the sixth wage round in the steel industry. A strike threat has been postponed; the White House stepped in at the last moment—as everyone knew it would. It will take courageous action to stem this tide.

If that is not done the rest of the sequence will be a familiar one. But its effect will be worse than ever before. For a while the labor front will be calm as the Wage Stabilization Board gets down to the routine methods of taking opinion, or testimony, depending on what you want to call it.

Already there have been rumblings from the Steelworkers' Atlantic City convention which promise a very bitter fight. Words flung there last week were fighting words. Delegates were brought to the highest emotional pitch in recent years by Phil Murray. Industry and its leaders were called about everything on a steelworker's list of invectives.

No matter what is said, we are in for a difficult time from here on out. The union has again set a strike deadline. Steelworkers have practically threatened to walk out if the WSB does not rule in their favor. If steelmakers balk because they are not given a proper price increase, labor will likely strike to force their hands—or that of the government.

So far, the steel industry is fighting a losing battle to stem inflation. There is a good chance that the union may get a substantial raise recommendation from the WSB. But the Office of Price Stabilization—if it keeps its present attitude—will make it extremely difficult for steel people to get a price relief order.

If a steel wage increase is recommended by WSB, the OPS will have to find some way to recommend a price increase, or a new and dangerous impasse will be reached. A steel wage raise—if it should come—will be a bellwether for all other large and small industries connected with metals.

If the country goes through a sixth round of wage and price increases, workers will gain little or nothing in real purchasing power—wage increases invariably mean higher cost of living. The money for a wage increase comes from the price of the product made.

Tom Campbell

Editor

SCIENCE NEWS FOR YOUR HEAT-TREAT

For the first time, plant metallurgists can control carburizing by direct measurement of carbon in hot furnace gases.

Scientists have long known that the electrical resistance of a piece of steel will change whenever there's a change in the carbon content of the metal. This basic fact is now being put to work by many progressive metallurgists and heat-treaters. For L&N has applied the principle in a brand-new Primary Element called a Carbohm. In use, a Carbohm projects into the heat-treating furnace . . . looks rather like a thermocouple. Whenever the amount of active carbon in the furnace gas begins to increase or decrease, the Carbohm detects the change. An automatic controller connected to the Carbohm throttles the carbon supply up or down, to keep the furnace gas at desired strength. And a Micromax Recorder plots the result . . . as easy to read as a record of temperature.

The complete equipment—Carbohm, Controller and Recorder—is called Microcarb Control. Because the furnace and its temperature control must be designed to meet the needs of atmosphere regulation, Microcarb can be used only with the Series H Homocarb Furnace. It's our opinion—based on 35 years' experience in making fine heat-treating equipment—that any heat-treating department can do better work with Microcarb than by any other known means. And, because Microcarb adds another automatic control to the carburizing process, it should enable your plant to cut the costs of any carburized, mass-produced part or parts.

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Heat-Treating Furnaces

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Please send Sec. 1 of Catalog T-623; Microcarb Control only

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Firm

Address

My title

Dear Editor:

Letters from readers

Mr. Fleischmann Protests

Defense Production Administration last week made public a letter from DPA Administrator Manly Fleischmann to Paul Wooton, chairman, executive committee, Society of Business Magazine Editors, commenting on an editorial in THE IRON AGE (Nov. 29, p. 7) which Mr. Wooton had called to his attention.

Dear Paul:

I am glad to have the copy of Tom Campbell's editorial from IRON AGE. I know of Tom's real interest in the scrap program not only through his publication but also because of his real help to the scrap recovery program as a member of NPA's Business Press Advisory Committee on scrap.

Mr. Campbell's editorial reflects a familiar point of view towards the exchange of materials among the nations associated in our common defense effort. I have encountered this attitude many times, but I cannot agree with it.

People who hold it usually regard themselves as taking a hardheaded and realistic view of the national interest. My own judgment is to the contrary. The attitude seems to me to be unrealistic in its appraisal of the extent to which the nations of the free world must work with one another to make contributions to secure common gains. Beyond this, I think the point of view expressed by Mr. Campbell is unrealistic in its appraisal of the immediate advantages to the United States of securing more aluminum in the first quarter 1952 . . .

The nations on which we depend are not content to accept payment in dollars which they cannot spend for materials and products they need. It is as simple as this: We have to give them what they need to get what we need in return. . . .

As to the specific transaction to which Mr. Campbell made reference, it is my judgment that both countries have gained from the exchange. For the first quarter 1952 we faced a very difficult problem in aluminum. After meeting direct military and important defense-supporting requirements, so little aluminum was left that we were facing the necessity for reducing allotments to manufacturers of less essential types of consumer goods to as little as 10 to 15 pct of their consumption of aluminum in a comparable period before the Korean invasion.

Inevitably, this would have meant closing the doors on thousands of establishments that could not afford to operate at such a low rate of activity. The problem was sharpened by the fact that we anticipate later in 1952 and 1953 substantial additions to our aluminum supply growing out of the expansion program. I was concerned to find some way to avoid shutting down so many firms when there seemed every likelihood that within a relatively short time we might be able to increase their allotments. The aluminum we have secured from the United Kingdom has made it possible to increase allotments to these firms and probably will be of major assistance in helping to keep them going, as well as in continuing to provide employment for tens of thousands of workers . . .

The United Kingdom is a bulwark in our free world association of nations and is making a greater effort to build military strength than any of the other nations with which we have allied ourselves. To accomplish its objectives, including its rising military production, the United Kingdom must have raw materials. I am glad that we have been able to help them with some 46,000 tons of premium-price steel ingots which would not have found a ready market in this country under existing price regulations.

On balance, if one views both sides of the transaction realistically, in my judgment both nations have gained. Mr. Campbell is certainly right in pointing out that in exporting ingots we have lost some scrap that would have been produced in the fabricating process.

No one is more conscious of our domestic scrap problem than I am, but I believe that our gains have at least balanced our losses. It is true that the export of any metal involves some loss of scrap, but in the kind of international structure that we are trying to establish, the exchange of resources must be conducted within a framework that balances losses against gains.

I have hopes that in the future it will be possible to enlarge the scope of such international transactions in ways that help all the participating nations. It seems to me that our common cause is advanced as we realize that our mutual defense is built on effective participation by all of the associated nations and does not rest on a one-way flow of assistance that alway originates in the U. S.

Manly Fleischmann,
Administrator

Defense Production Administration
Washington.

We stand on our editorial.—Ed.

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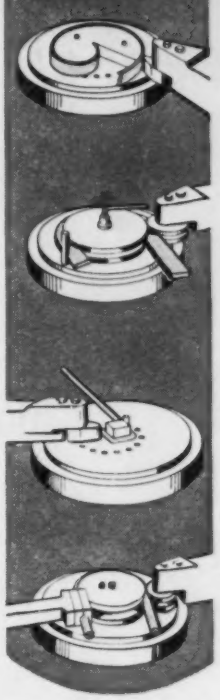

This instructive and authoritative booklet will quickly prove itself indispensable wherever bending is done or is needed. It brings you a veritable gold mine of tested authentic bending methods applicable to any rotary type bender. The proper bending technique may frequently offer a new approach to an old problem by simplifying product design and cutting production costs.

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SELECT YOUR MAGNET from two Ohio types. The PROTECTO-WELD magnet, shown here, is made in 39, 46, 55 and 65-inch diameters. Bolted construction types include these and other smaller sizes.

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CHESTER BLAND, *President*

Ohio ELECTRIC

A-1914

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Production of certain types of bearings for armored vehicles has been cut back because tank production is not up to the level set when the bearings were ordered. It is not bearings, but other parts that are slowing tank output.

► Initial tests of ductile iron molds for stainless steel ingots look promising from the standpoint of life expectancy and ingot surfaces.

► Australia claims to have the world's largest known titanium deposits--conveniently located for water shipment. They are mainly of high grade rutile, up to 96 pct and are marketed at up to a 98 pct concentrate. Large scale production of concentrates is expected to start there soon.

► The Air Force plans to change aircraft landing wheels from a drop center wheel rim to a flat-based type to decrease tire flapping and swerving after a blowout.

► Washington dirges on the shortage of structural steel capacity are not likely to prove as dismal as they sound. Considering only requests for structurals against availability, they do look like just about the tightest steel item--now. But right now all expansion programs are being pushed at once--structural demand is not likely to hold at capacity once the expansion pressure eases.

► An entirely new system of centralized tool control is being tried in a large auto plant. One machine tool builder is so interested that he plans to have a resident observer on the scene for at least a year.

► Shatterproof windshields now being made in France have a 6-in. diam circle directly in front of the driver which is tempered in a different manner from the rest of the glass. If a pebble shatters some other part of the windshield the driver's circle remains clear.

The French also make an automatic dial telephone with the user's commonly called numbers set in advance. He sets a pointer against a name and presses a lever to dial automatically.

► The government has so far met with little success with "moral suasion" efforts to get steel users to shift to less critical alloys, including boron steels. Many steel users will go along eventually, but in their own way and not until they've checked carefully, particularly against the experience of others.

► Armour Institute is now studying electric power transmission systems for aircraft, while continuing research on hydraulic and pneumatic systems. With controls becoming constantly more involved their increasing weight is getting worrisome--which explains why efforts have been made to substitute titanium for copper control tubing.

► Correction: The item on this page in the Dec. 20 issue reporting that rail steel quality reinforcing bars could be obtained without CMP tickets was in error. Like other steel, they require CMP tickets.

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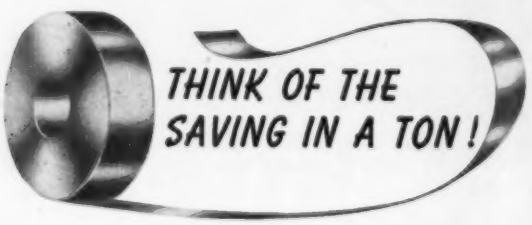


HOT-TOPS: Demand Strains the Supply

Military needs intensify demand for hot-topped ingots . . . Special handling slows production lines and cuts mills' output . . . Ties up molds and soaking pit space—*By E. C. Beaudet.*

With defense requirements steadily taking a larger portion of the nation's steel output, producers are once again faced with the problem of making carbon steel of more exacting chemical and physical requirements. As a result more strain is being exerted on hot-topping facilities which are needed in the production of specially prepared carbon steels to guarantee internal ingot soundness, structure, quality, and increased ingot yield.

Demand for hot-topped ingots has increased noticeably in the last 6 months and is expected to continue rising this year as the production of shell steel, high grade special plate for tanks, gun shields and mounts and other military items is stepped up. During 1950 production of hot-topped ingots came to 11.7 million tons. Last year it rose to around 14 million and is still going up.

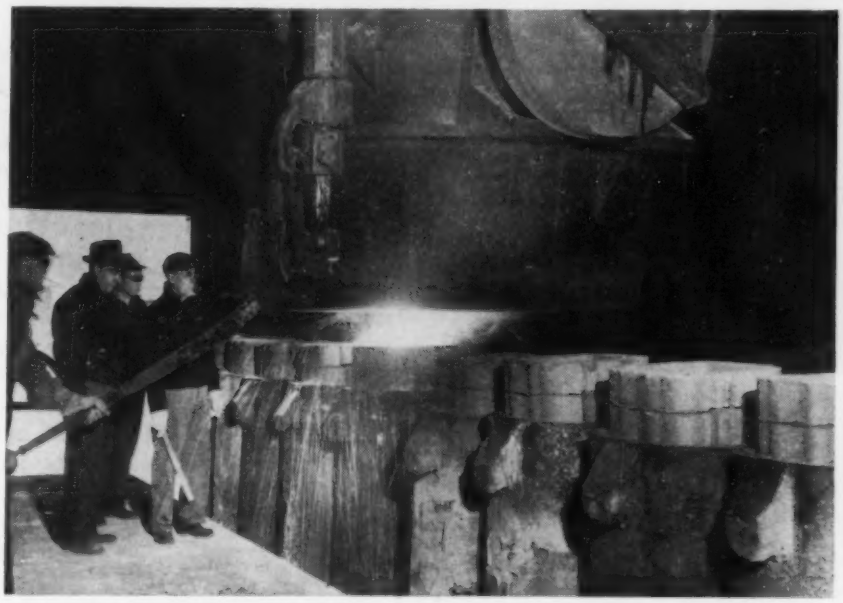
More Time—The special handling and processing required in the production of hot-topped steel causes bottlenecks which slow up production and limit a mill's overall tonnage output. In general, steel grades poured into hot-tops are of a high quality and require more time and care in the open-hearth to make a heat. Pouring time also is considerably slower.

Preparation of hot-tops before setting them on the molds takes additional labor as they have to be slurried, sand rings and wipers put on, and then set on the molds. Storage space is cut down because of the need for storing linings, castings, sand rings, wiper strips, wire clips, wooden blocks and slurring material.

Ties Up Molds—Mold availability is substantially reduced when steel is hot-topped. In general a set of hot-topped molds can be used twice every 24 hours as against three to four times when a set of open top ingots are used. This is the result of several factors: Molds are dragged slower through the plant to prevent nonmetallic inclusions from hot-tops dropping into the molds prior to pouring; to prevent disturbing the set of the steel in the mold after pouring, hot-topped steel is held for longer periods in the molds for proper solidification of the ingot; steel is delivered in molds to the soaking pits as compared with open top ingots which are delivered to the pits already stripped.

Longer Soaking—Soaking pit capacity is cut down when hot-top production increases. Generally the ratio of the time from tap to charge to soaking time is one to one for ordinary carbon grades. When hot tops are used this varies from 1.25 to 1.5. Since the holding time is longer for hot-topped ingots, the soaking time has to be correspondingly increased.

Scheduling difficulties arise when smaller tonnages of hot-topped steels have to be fitted into open top schedules. The longer soaking time, more careful handling through the blooming mill and entire rolling cycle and the need for additional slow cooling facilities require more careful



HOT-TOPS: Teeming electric furnace steel into ingot molds fitted with refractory hot-tops at the South Chicago plant of Carnegie-Illinois Steel Corp.

PLASTIC: Will It Work As Tie Plate?

Dynakon Corp. says polyester can move in on some metal applications . . . Erie Railroad tests it as tie plate . . . Can be machined and drilled . . . Has high strength—*By W. W. Taylor.*

Polyester, a glass fiber reinforced plastic, is beating at the door of some metal applications. It is made of sterner stuff than the usual plastics that are finding their way into industry and home. With high corrosion resistance, the plastic also has electrical or insulating properties, and has structural strength, and machineability.

Polyester's creator, Dynakon Corp., of Cleveland, is pushing acceptance of this plastic-bonded material by industry. Erie Railroad Co. is testing it for use as rail tie plates.

Dynakon claims polyester is as strong or stronger than steel and will not rust. It is a good insulating material, thus halting leakage of current when used as tie plates. Since such leakage raises costs of operating block signals and other electrical rail equipment, roads are interested.

Resistance of Stainless—Dynakon says polyester is comparable to stainless steel in resisting chemical action of salts, acids, brine. Glass polyester plastics can also withstand rough handling usually given chemical plant equipment.

Dynakon produces polyester as rod, mat sheet, cloth sheet, molding compounds, and molded cloth or mat. For small production mat and cloth can be molded by hand on wood or cast molds. This process is currently being used in making some aircraft and marine parts.

ON PRESS: Fiber glass "mat" being inserted in mold prior to adding resin and molding.

Molding-compound parts are similar but superior to phenolic plastics in versatility of molding. Mat laminates can be used for production molding of parts now made of sheet metal stampings.

Except in its cloth form, polyester is comparable in most machining and stamping respects to brass, Dynakon claims. Drilling and tapping is accomplished with low power requirements, producing smooth holes free from chipping and with stronger threads.

These glass fiber polyester plastics are also said to have turning, milling, shearing, and sawing qualities similar to brass. By substituting sheet-laminating, punching, and postforming it is not necessary to use highly skilled and low-speed process of contour molding. Parts to be shaped are first placed in an oven and heated to 400°F for about 5 min.

Still Strong—They are then placed in a forming jig or mold, which may be a simple casting with a clamp attachment. After cooling to about 150°F the finished parts can be removed from the form—still capable of withstanding rough treatment as before postforming.

One challenge met by Dynakon-produced plastics was the manufacture of large spools which had to be held to close tolerances between ends. Metal ends were not suitable because they became dented when dropped or abused. Spool ends made of polyester sheet hold necessary tolerances without fear of damage.

Housings used at first by the Impact-O-Graph, an instrument recording time and force of impact to packages in transit, were subject to corrosion from batteries after long periods. Molded polyester housings now in use will not corrode and will withstand a good deal of shock abuse, reports the Cleveland firm.

There is no doubt that glass fiber reinforced polyester plastics have a place in industry as a prime product, not a substitute. But if service temperatures are higher than 350°F, or if extreme complexity and extreme strength are needed in combination—then forget reinforced plastics. For some other applications there is an economic advantage.

Special Report

Continued

scheduling. If a heat is missed and steel isn't delivered to the right place at the right time production is further cut down. In some cases the bottleneck will deprive certain rolling mills of steel or have an adverse effect on reheating furnaces and slow cooling facilities.

Although steel expansion programs will help to alleviate the pressure on hot-topped steel demand there will always be difficulty when hot topping needs are boosted out of proportion. This is due to the fact that increased production of hot-topped steel must come from plants whose production is primarily on open top ingots since those plants having extensive hot-topping facilities will be already operating at peak.

Power Made from Atomic Reactor

Electric power of more than 100 kw has been generated from heat energy from the experimental breeder reactor at National Reactor Testing Station, according to Atomic Energy Commission.

The heat energy was removed

from the reactor by a liquid metal at a temperature high enough to generate steam to drive a turbine. Power generated was used to operate the pumps and other reactor equipment and to provide lights and electrical facilities for the building.

AEC officials warned that the power generation is incidental to other research, but experiments on it will continue. They stressed that costs of power from the reactor should not be compared with those for conventional power since cost was not an essential factor of the experiments.

Western Power Needs Estimated

What the future holds for the industrial West may be gleaned from estimates of power demands in California alone as made by the California Manufacturers Assn. A survey by this group anticipates electric energy demands will rise 15.7 pct in 1951 and up to 38 pct in 1954; and gas requirements up 13 pct in 1951 and 30 pct in 1954.

Indicative of the place the iron and steel industry has in this expansion is the report that it creates 28 pct of the state's annual industrial use of electric energy and accounts for 22 pct of the firm gas consumption.

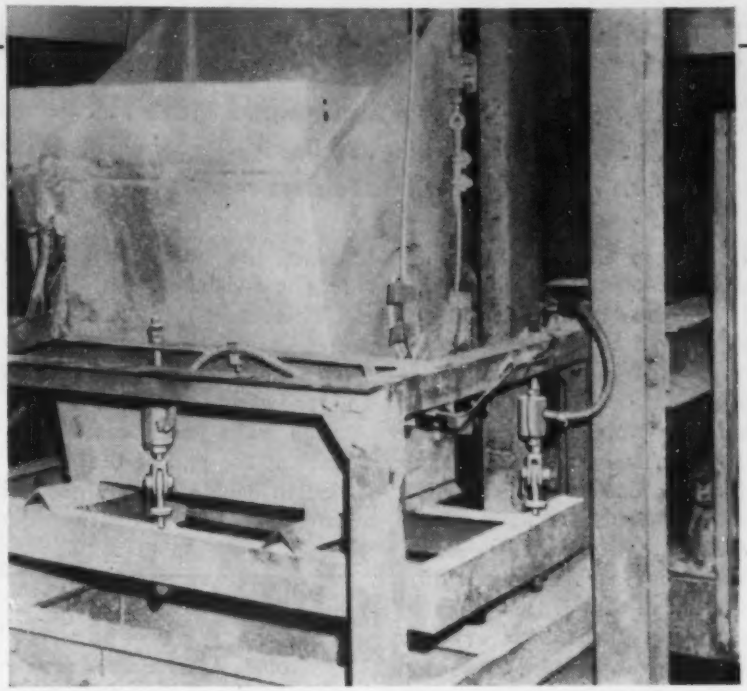
In northern and central California the Pacific Gas and Electric Co. expects 48,000 new customers of all types in 1952.

Reserve Mining Interest Split

Republic Steel Corp. and Armco Corp. have jointly acquired the 15 pct interest in Reserve Mining Co. formerly held by National Steel Co. This gives Republic and Armco an equal 50 pct interest in Reserve Mining.

The new taconite pilot processing plant is expected to be in operation early this year. Unfamiliarity of workmen with this type of equipment and the tieup on machinery delivery will stymie production during 1952—so that the original production goal will not be met.

Main plant will be in operation in 1955. Latest blast furnace tests have proved highly favorable.



Mold Sand Mixed Electronically

A new method of automatic electronic weighing and control of mold sand mixes has been adopted at General Steel Castings Corp.'s Granite City, Ill., plant. Use of the method has increased the production of milled sand about 15 pct and greatly improved the consistency of physical properties of mold sand.

The accuracy and reproducibility essential for high quality steel castings are assured by the process, the company claims. A strip chart recorder provides a continuous check on the accuracy of sand proportions.

Weight of molding sand in the skip bucket, measured electrically by three Baldwin SR-4 tensional load cells, controls sand proportions before pouring into the muller. The system can handle three types of sand as now set up, although only two are presently used. More can be added if and when needed.

As presently operated, dials on the control board are set for the quantity of sand to be fed from each bin onto the conveyer belt. Vibrator feeds are actuated by the load cells, while panel lights show which sand is being fed. When the preset weight is reached, the bucket is raised to pouring position.

The load cells are fully enclosed and sealed, with negligible deflection under load. The sensitive elements are Baldwin SR-4 resistance wire strain gages mounted between plastic impregnated paper. They are cemented to a metal tension member running through the cell and are electrically connected to form a Wheatstone bridge circuit. The bridge is unbalanced by changes of electrical resistance in the gages caused by strains transmitted to the wire grids. A Leeds and Northrup Speedomax recorder-controller translates the change into recorded pounds and delivers the required amounts of sand to the skip bucket.

Load cells are connected to limit switches to insure proper mix proportions. Springs and oak shear pins protect the cells against impact overloads. Although sand mills and skip buckets are still manually operated by push buttons, automatic equipment will be installed.

STEEL: USW Is Angry But Cocky

Distrust of steel industry is convention theme . . . Delegates vote 45-day postponement . . . Union expects favorable WSB verdict . . . Truman writes, Fairless regrets—*By J. B. Delaney.*

After more than 14 years of collective bargaining, organized steel labor and steel management are still poles apart. Despite a lot of brave talk, a fundamental antagonism exists.

This antagonism was more apparent than ever during the 2-day special convention of the CIO United Steelworkers of America at Atlantic City last week. It stuck out like a sore thumb. Furthermore, the thumb was waggled to make certain that everybody could see—even those who wanted to believe otherwise.

The remarks of President Philip Murray, his officers, and those of the 2500 delegates who spoke from the floor were bitter. As far as they were concerned, and in the words of President Murray, "The steel industry can go to hell."

Distrust—Theme of the convention, instigated and encouraged by President Murray, was extreme distrust and ridicule of the steel industry. Some of the talk was tough and profane. Steel management people were roundly denounced, often in colorful language, with the emphasis on the management of U. S. Steel Corp.

The convention was cocky and self-assured.

It voted to postpone, at the request of President Truman, its strike against the steel industry. It attached a 45-day deadline to its postponement—45 days from start of Wage Stabilization Board hearings which are scheduled to open Jan. 7.

New Threat—If, after expiration of this deadline, the Wage Stabilization Board has not returned a recommendation acceptable to the union, or, if the recommendation is acceptable, the steel industry is not willing to go along, the union will again be free to strike.

This means, almost certainly, that about Feb. 21 the steel industry will again be confronted with a renewed threat of a strike. The union wage policy committee will meet at the end of the 45-day period to decide a course of action. From here on in, continuation of steel production will be uncertain.

Delegates were cocky, believing that the union has an excellent chance of a favorable decision from WSB—at least favorable enough to accept.

Demands—USW is demanding a 15¢ per hr wage increase, an increase of ½¢ between job class increments (averaging about 3½¢), the union shop, guaranteed annual wage, paid holidays, elimination of geographical differentials, a new deal on incentives, premium pay for Saturday and Sunday work as such, increases in evening and night shift differentials, and other benefits. The "package" contains 22 points. Cost to the industry would be approximately 45-50¢ per hr.

Mr. Murray has plenty of reason to feel that he can present his case to WSB with some degree of confidence. For one, he has a "Dear Phil" letter addressed to him by President Truman.

David J. McDonald, secretary-treasurer of the union, read this letter to the delegates. It opened with a commendation of the union for its decision to halt the strike scheduled for Dec. 31. It concluded with an expression of confidence that both sides, with the help of WSB, will arrive "at a fair settlement without costly loss of production."

Sends Regrets—Mr. Murray read to the convention a telegram from U. S. Steel President Ben Fairless declining an invitation to address the meeting. Mr. Fairless said that no good purpose would be served by his talking to the delegates.

Mr. Fairless made up his own mind on whether to appear at the convention. Despite indications that "emissaries" had proposed "conditions" to his appearance, Mr. Fairless was ignorant of any such proposals. It was his own decision and his own reply.

Murray Reports—As for the union, President Murray said that no hard-and-fast rules were attached to the organization's invitation to Mr. Fairless.

In his official report to the convention on the status of negotiations with U. S. Steel and industry, Murray stated that reaction to union economic proposals was entirely negative, that counter-proposals by U. S. Steel on non-economic issues were designed to "turn back the clock."

The union made it clear that any agreement eventually reached must be retroactive to the date of expiration of practically all basic steel contracts—Dec. 31.

Asks Interlocking Study

Admiral Ben Moreell suggests that Office of Price Stabilization conduct hearings on a steel price increase at the same time, and along the same lines as the Wage Stabilization Board's investigation of wage issues.

The Jones & Laughlin Steel Corp.'s chairman made the suggestion in a telegram to WSB Chairman Nathan P. Feinsinger. Copies of the telegram were sent to Charles E. Wilson, director of defense mobilization, and Economic Stabilizer, Roger L. Putnam.

The Admiral said the price investigation should be to determine "the amounts of price increases which are essential to maintain the steel industry in a state of good health."

STEEL: Why Fairless Declined

Steelworkers' minds seen made up . . . Acceptance would serve no useful purpose . . . Fairless didn't bargain over questions and answers . . . Union leaders vitriolic—*By Tom Campbell.*

The tenor of the Steelworkers' special convention at Atlantic City last week bodes no good for labor relations in months to come. Phil Murray let loose one of the most vitriolic attacks on Ben Fairless and his company that has been heard for some time.

The tirade was touched off by Mr. Fairless' refusal to attend the convention to present his side of the wage-price argument. He had been invited to do so by Mr. Murray.

Second Guessers—Steel labor, steel officials and newspaper men all had their own rhubarb over whether Mr. Fairless should or should not have met the challenge to talk to the steelworkers.

Labor thought he ought to defend his stand of no wage increase, no price increase. It would have been a good chance to get a boss on the spot even though Mr. Murray had given a promise of safe conduct.

It Isn't So—Newspaper stories had Mr. Fairless bargaining about questions and answers and favoring exclusion of newspaper men if he spoke. This was not the case. He made no request that questions be written beforehand or that there be a closed session.

Some people in and out of the steel industry felt that Mr. Fairless missed the chance of a lifetime to face the steelworkers and thus make a good "public relations" story. It never occurred to them that he had no thought of making public relations out of a speech to steelworkers.

His Stand Is Known—Mr. Fairless' stand on wages and prices is well known. He believes that the country faces a catastrophe if wages and prices keep going up. He insists that higher prices must support higher wages if they come.

At first thought Mr. Fairless considered accepting the invitation. After turning the whole thing over in his mind he refused the invitation because, as he said, "it would serve no good purpose since the delegates had made up their minds on the issues." From that refusal came all kinds of interpretations.

Benefit No One—Because Mr. Fairless believes that higher wages and prices will hurt the country he will have nothing to do with any effort to raise either. He felt a speech to an audience whose mind was made up would benefit no one.

Steel's Position:

U. S. Steel gives wage position in "statement of facts."

Prior to the United Steelworkers' war council in Atlantic City last week, U. S. Steel issued a "statement of facts" setting forth the company's position in the current wage - price controversy.

"We're all one big happy family here."

Not counting the union's demand for a guaranteed annual wage, the 22-demand package would add more than 50¢ per man-hour to the company's total employment costs. This would be more than $350 million a year.

It would soon result in an equal increase in cost of goods and services—or a total increase in U. S. Steel's costs of more than $700 million a year.

Deficit Seen—U. S. Steel says unless this additional cost were offset by an increase in steel prices, it would wipe out current earnings completely, leaving the company with an operating deficit of about one-eighth of a billion dollars a year.

In such case, the company would pay no Federal taxes, have no profits from which to pay dividends, and have nothing left from record sales to reinvest in modernization and expansion of steel-making facilities.

The company cited news reports out of Washington that government officials have told the President the steel industry can absorb a 15¢ an hr wage increase without a price increase. It admits this is mathematically possible, but warns this would be disastrous to U. S. Steel, the industry and the public.

Profit Position—U. S. Steel's profits have been going down while production was going up. Comparing the first 9 months of 1950 with first 9 months of 1951, here's what happened:

Shipments—increased 9 pct.

Employment Costs—went up 19 pct.

Supplies—cost 21 pct more.

Federal Taxes—rose 100 pct.

Profits—went down 25 pct.

Dividends—were 20 pct less.

In addition, earnings left to be plowed back into business fell 34 pct. In view of this, the company is concerned about its ability to meet financial commitments of its expansion program.

TRUCKS: Defense Could Drop Output

Production fares better than most now . . . But output of military vehicles could cut allocations from NPA . . . Shortages so far not serious . . . See roads as inadequate—*By T. Metaxas.*

While Washington does a hatchet job on other civilian production, the trucking industry with its heightened esteem as a hauler for defense rolls along at a fair clip. Production has declined but is still respectable when compared to cutbacks in other industries. National Production Authority allocations are now seen by truckers as slipping but nearly adequate. But these may narrow down dangerously when a full-throttle defense program takes to turning out military vehicles in dead earnest.

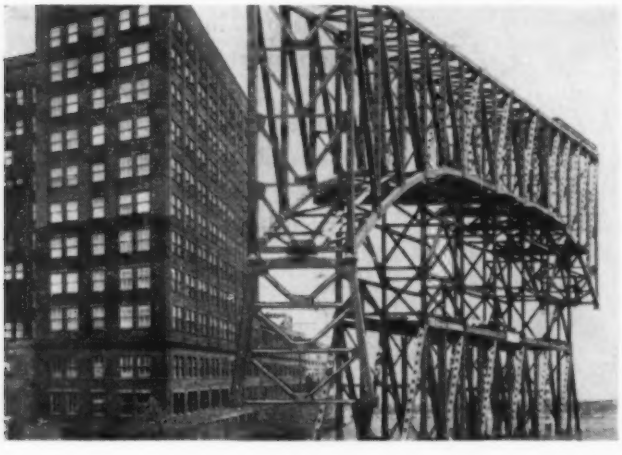
Truckers know there will never be a reversion to World War II apathy that devoted all facilities to military vehicles and brought civilian truck output to a full halt. But necessity of producing war vehicles under an expanding defense program may crowd some civilian trucks off the assembly lines — however unwilling Washington may be. Diversion of materials to the military is also another top ranking threat.

Hit Target—NPA's target for trucks in 1951 was 1.3 million units. This was met because of a flying start early in the year. The last half of the year showed a dip in production because truck makers had to start the slow job of tooling for defense. This slow-up continues into 1952. There are now about 8.7 million trucks and tractors on the nation's highways.

Expanding defense production will impose a greater load on truckers than ever before. But they are confident they can carry it. Defense contract subcontracting is bound to spread this year. The hauling job will become more intricate as truckers haul parts and goods from one plant to another—making subcontracting possible by tying in smaller subcontractors to prime contractors.

Thus far truckers have not been hit by any serious shortages. Their tire situation is comfortable and no future difficulties are foreseen here. Enough replacement parts are being made to maintain truck fleets and truckers expect a sound parts policy to continue even if truck output sinks sharply.

Mileage Gain—Truckers traveled 137 million inter-city ton miles last year, a 10 pct gain over 1950. A greater gain is expected in 1952 if defense speeds up. Demand for trucking services is continuing its upward spiral. Biggest selling feature is trucking's flexibility that permits easy shipment of small loads over shorter distances than railroads could economically handle.



HIGH SPAN:—For the superstructure of the Chesapeake Bay Bridge, Bethlehem Steel Co., is floating some spans almost as high as its 13-story general office building, as this composite photograph shows. Top of the highest deck cantilever anchor span is 172 ft above water, while the building at Bethlehem, Pa., is 180 ft high.

Truckers say that if a drastic highway improvement program is not instituted immediately the sad condition of America's roads will nullify its ability to produce vehicles and at the same time impair an important transportation network.

The number of registered vehicles has surged up to the 52 million mark. In 1931, 26 million were registered. While the number of vehicles has doubled, the total mileage of American highways has shown only an insignificant rise. There were a total of 3,286,000 rural and urban miles in 1931 and a similar number of road miles last year.

Roads Collapse—During World War II hardly any maintenance work was done on roads. In the postwar period inflation and shortages kept this work down to a minimum. Now defense officials are standing by their decision to delay highway expansion. Yet the roads are too narrow, too rutted, and too overstuffed to permit the trucking operator to use his equipment to full advantage.

Truckers are also anxious to evade "unsubstantiated charges" that heavy axle loads are destroying roads. They have a complete file of evidence to prove that unwise engineering of highways on muddy and shifting soils leads to their premature collapse. They say roads would not be in trouble today if a sufficient subgrade was put in to stabilize the concrete or asphalt. Bad drainage also is a notorious road wrecker whose damage is frequently blamed on trucks.

Truckers point to two recent examples of road breakdowns that could not possibly have been caused by trucks. A stretch of highway on U. S. Route 68 between Kenton and Dunkirk, Ohio, was reported to be falling apart shortly after construction. A 1-mile stretch reportedly went to ruin near New Philadelphia, Ohio, 15 minutes after it had been opened to traffic.

SCRAP: On Churchill Mission Agenda

British may ask American steel industry to stop buying scrap in Europe . . . Deprives scrap-destitute English mills . . . May stress it's better to give England the scrap than the steel.

A sideline discussion of the Winston Churchill mission to Washington may dwell on scrap iron and steel for English mills. London sources of THE IRON AGE report that the mission may ask the withdrawal of the American steel industry from purchasing scrap in Europe.

Mr. Churchill's experts will probably argue that American scrap buying may deny future supplies to needy English mills which have already been stricken with shutdowns of openhearth furnaces. Although American mills are suffering from the scrap crisis, English mills are far more desperate. A shortened scrap supply from Europe, especially from Germany, has hurt British steelmakers and has thwarted their attempts to boost production.

Scrap or Steel? — As a final point to its argument, the mission may point out that it is better to give England the scrap than to ship it American steel to make ends meet. With the scrap English mills can make the steel which otherwise might have to be squeezed out of the American economy.

Now that the new Conservative government is planning to denationalize the steel industry, it might serve the interests of America to lend all assistance possible to make the conversion successful, the British may say.

American imports of scrap from Europe are very minor. In the postwar period war scrap was abundant in Germany. America shipped a little to its mills and Britain took its share. Resurgence of the European steel industry soon crowded out most American buyers while the British maintained a shaky handhold in the market.

War scrap was not inexhaustible and the Germans had no incentive to ship out their own scrap steel. Their industry was making a comeback.

Import Record—In 1948 America imported 370,600 tons of scrap iron and steel from Europe and other countries. In 1949 the total shot up to almost 1 million tons. In 1950, the total was 652,000 tons and last year about 390,000 tons was brought into this country—with the proportion of European scrap sinking sharply.

British steel production is likely to be held to 18 million net tons in 1952 by shortages of fuel, ore, and scrap. It could be pushed to 18.7 million tons if these obstacles could be overcome.

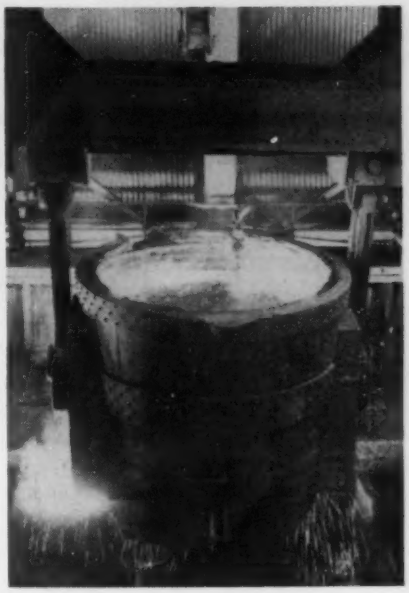
The Conservatives are now urging the nationalized coal industry to step up the supply of coal for the steel industry's coke ovens. Ore shortages may be softened by expanding imports of Swedish ore in return for British coal. This will be a sacrifice on the part of Britain because it also is suffering a coal shortage.

Tinplate:

Shortage caused by lack of manufacturing capacity, not tin.

There is no shortage of tin for tinplate manufacture; any shortage is due to the lack of manufacturing capacity, according to Britain's Tin Research Institute. The lack of manufacturing capacity is principally in high-quality steel base.

Big projects are moving ahead for increased production, says the Institute, and it has been estimated that annual output may rise to 8 million tons by 1961. World production was 5.7 million tons in 1950 and less than 3 million tons annually 20 years ago.



HOT STUFF: Teeming steel ingots at the Margam Abbey Works of Steel Co. of Wales, Ltd. Opened this summer, the plant, when completed, will have a weekly capacity of 19,000 tons of pig iron, 30,000 tons of steel ingots, and 15,000 tons of coke.

This anticipated rise in output will come from new facilities, now building or planned, in the U. S., the United Kingdom, France, Italy and Holland. New plants are substantially complete in Belgium and South Africa, and further projects are possible in Australia and India. In the United States large increases in capacity are certain, perhaps on the order of 1,000,000 tons in the next 5 years.

Not Enough—Talk of aluminum sheet as an important alternative to tinplate, the Institute comments, often ignores the fact that there is just not enough aluminum available to make more than a very small contribution to the market's needs. U. S. tinplate output in 1951 was 4.2 million tons, while total aluminum production for all purposes was about 837,000 tons.

The new Trostre plant of the Steel Co. of Wales, with a capacity of 7000 tons of tin mill products per week, is not yet in full production. Pickling, cold reduction, and some cleaning is now being undertaken, and a cutting line is running to cut the coil into plates or sheets.

STEEL: Wilson Applauds Expansion

Some shortages to stretch through '52 . . . Expect 123 million ton capacity by 1954 . . . May push pig iron capacity . . . Don't plan substantial growth of fabrication—*By A. K. Rannells.*

Industry's progress with steel expansion plans deserves a round of applause, although shortages of at least two key products—structurals and plate — will continue throughout 1952.

Defense Mobilizer Wilson gave this opinion this week in his review of fourth quarter and 1951 defense mobilization.

Defense Production Administration has approved and extended aid to a program which is expected to provide by 1954 steel ingot capacity of 123 million tons with potential output of 120 million net tons; blast furnace capacity of 85 million tons; and coke oven potential of 84 million tons.

Depends on Scrap—This is the cut-off point for government aid. Pig iron facilities are a possible exception. Wilson said that if scrap shortages persist, more pig capacity will be needed.

Wilson does not see this 120 million-ton goal as resulting in any substantial steel surpluses but says it should be ample and a "little more" than foreseeable "normal" requirements after 1953.

He is less optimistic about scrap. Clean-up of automobile graveyards and government warehouses is expected to pull the fat out of the fire for the time being. But a minimum of 40 million tons of purchased scrap will be needed to support an annual output of 120 million tons of steel.

This amounts to from 3 to 5 million tons more than is now in sight —not counting, however, potential scrap from present military production which will start becoming obsolete a couple of years hence.

Fabrication—No substantial expansion of fabrication facilities other than now planned is seen as needed—even for structurals and plate. Present doubled demand for these is seen as abnormal and as leveling off at about present planned capacity.

"The outlook for the remainder of 1952 is not fully clear," Wilson says, "but we can be sure the pinch will continue into 1953. Second quarter allotments will have to be somewhat tighter than the first."

Much is made of the fact that 1951 production levels, despite restrictions, did not fall below 1947-49 levels. But this was before sharp first quarter cutbacks and pending second quarter reductions.

Check Military Needs—Bowing to pressure, control agencies have been going over or "re-examining" military requirements. Odds are that any cutbacks or deferrals will be more than offset by a "necessary raising of other military goals."

"Re-examination will not change the basic pattern," Wilson said after submitting the report. "We do not intend to take any needed materials from the military for civilian production."

Other highlights of the 1951 preparedness report included:

Machine tool output beginning to roll with rate of shipment at nearly $800 million annually, expected to rise to a rate of $1.2 billion by mid-year; order backlog is at $1.3 billion figure.

"How do you spell 'comma'?"

Armed services during 1951 were provided with $16 billion worth of equipment, supplies and construction, to bring the total since Korea to $20 billion.

American industry is currently working on outstanding orders amounting to more than $40 billion.

Defense Dept. still has $38 billion in unobligated funds, and next week the White House will ask for more.

Deliveries of war contracts are now at a rate of $2 billion monthly —65 pct or $1.3 of it in hard goods.

Industry Controls This Week:

NPA Orders

CMP Reg. 1, Amend. 1—Permits manufacturers to charge late deliveries of fourth quarter orders against fourth quarter quotas regardless of when delivered.

CMP Reg. 1, Amend. 2—Requires NPA permission to draw upon inventories for higher production.

CMP Reg. 1, Dir. 1, Amend.—Permits ACM orders without quotas under specified maximums.

M-6A, Sched. 2—Prohibits delivery of oil country tubular goods except on specific ACM orders.

M-25, Dir. 3—Allows tin can users to adjust bases for first three quarters of 1952 without going to NPA. Revokes and supersedes Dir. 1.

M-45, Sched. 3—Revoked. See M-94.

M-69, Amend. 1—Cuts use of sulfur from 100 to 90 pct of 1950 use.

M-94—Establishes revised controls on sulfuric acid.

M-95—Sets up new reporting procedures for railroad locomotive manufacturers. CPS Orders.

OPS Orders

GCP, SR 72, Amend. 1—Extends expiration date to Feb. 29.

CPR 22, Amend. 39—Provides simplified pricing of new commodities not sold during the base period but now priced under this order.

CPR 30, Amend. 27—Adds to commodity classifications for steel and other metal items.

CPR 30, Amend. 28—Extends price filing deadline for new machinery firms to Feb. 20.

CPR 30, SR 1, Rev. 1, Amend. 1—Permits calculation of overhead adjustment factors for an entire business.

CPR 30, SR 2, Rev. 1, Amend. 4—Allows machine tool makers to express three cost adjustments as a single price change.

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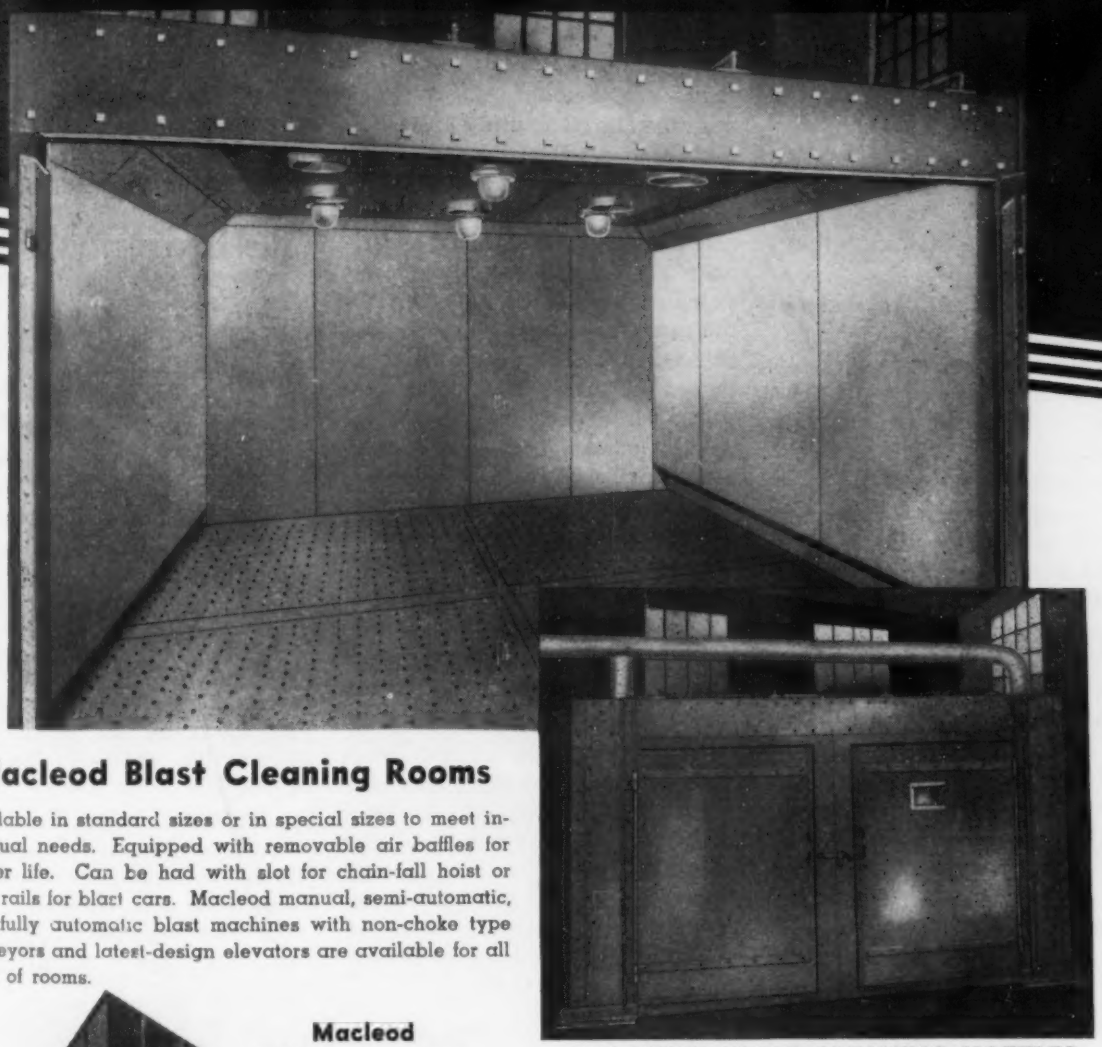
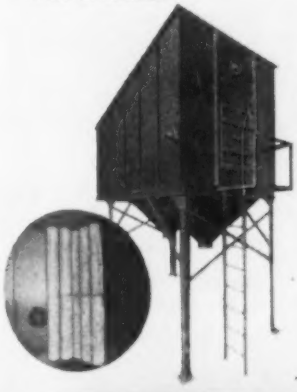


Macleod Blast Cleaning Rooms

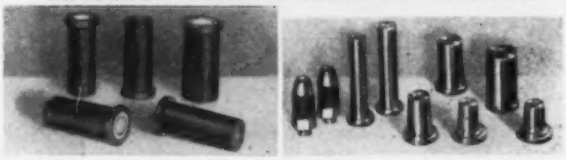
Available in standard sizes or in special sizes to meet individual needs. Equipped with removable air baffles for longer life. Can be had with slot for chain-fall hoist or with rails for blast cars. Macleod manual, semi-automatic, and fully automatic blast machines with non-choke type conveyors and latest-design elevators are available for all sizes of rooms.



Macleod Filter Tube Type DUST ARRESTERS

A modern, efficient dust collector of the easy-to-replace cloth tube type. Uses either manual or automatic tube shakers. Screen type arresters also available — with manual or automatic screen rapping mechanism.

MACLEOD BLAST CLEANING NOZZLES



Available in both Norbide (750 hours minimum service guaranteed) and Borium (300 hours minimum service guaranteed). Both types give longer service, decrease air consumption, and give better stream contour and abrasive velocity compared with iron nozzles.

Write for additional information or send specifications for estimate.

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CEILINGS: OPS Makes Them Easier

Two orders make price controls simpler to apply . . . New products not made in base period get simplified pricing scale . . . Machine tool makers may submit three cost changes as one.

Office of Price Stabilization last week took two actions to make price controls easier and more workable. The first (Amendment 39, Ceiling Price Reg. 22) provides simplified pricing of new commodities not sold during the base peried and now priced under that order.

Sheet metal products are among the items covered by the basic regulation, which has a catch-all characteristic because of the number of commodities priced under it.

Section 34, CPR 22, specifies that a manufacturer who cannot determine a ceiling price for an item under other provisions of the order may apply to OPS for a price. The same section provides that if an applicant has established a ceiling price under Sec. 3 and 7, General Ceiling Price Reg., he may continue using that ceiling after filing for a CPR 22 price.

Two Changes—Amdt. 39 makes two changes relative to Sec. 34:

1. A manufacturer who has established a ceiling price under any regulation, not merely the GCPR, may continue using that ceiling after filing for a CPR 22 price, pending establishment of the new price.

2. Duplication of filing for price ceilings under Sec. 7, GCPR, and Sec. 34, CPR 22, is eliminated. A seller who has obtained a Sec. 7 ceiling price by OPS letter order need not refile under Sec. 34.

Machine Tools—In a second action (Amend. 4, Supplementary Reg. 2, Revision 1, CPR 30), OPS allowed machine tools manufacturers to use three cost modifications simultaneously, expressing them as a single change in ceiling price. The action is not expected to produce any substantial changes in prices determined under CPR 30.

The cost modifications are permissible in computing rises in costs of overtime labor, shift premium hours, and increased subcontracting. Basic effect of the amendment is to allow cost experience of one quarter to be computed at any time convenient to the manufacturer during the first subsequent quarter, and to be reflected in prices for the second subsequent quarter.

This leeway is expected to be beneficial, because the experience record for increased subcontracting costs in a given quarter is not likely to be complete until some time after the quarter ends.

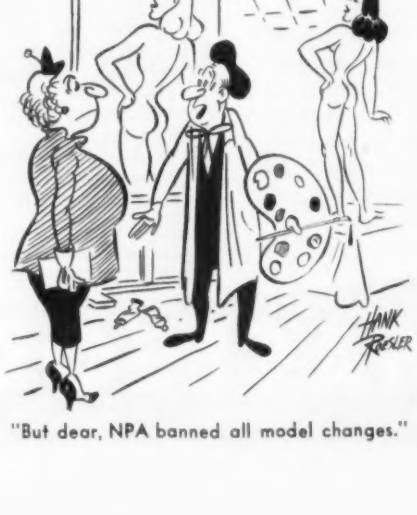
New CPR 30 Overhead Formula Set

Machinery manufacturers and other businessmen adhering to Ceiling Price Reg. 30 may take advantage of a pricing action permitting calculation of overhead adjustment factors for an entire business.

Earlier, those pricing under CPR 30 were required to figure individual dollar-and-cents adjustment factors for each item produced. As Office of Price Stabilization sees it, dropping of the previous method will simplify the businessman's work and yield "virtually the same results."

Authority for using an over-all adjustment factor is established in Amendment 1, Revision 1, Supplementary Reg. 1, CPR 30.

Another recent change to CPR 30, Amdt. 27, amplifies and adds to commodity classifications for steel and other metal items.



"But dear, NPA banned all model changes."

Steel Export Quotas Readied

Export quotas of CMP carbon steel for the second quarter are expected to be established and announced this week as Defense Production Administration ended its big job of wading through applications covering more than 1 million tons.

Only a small percentage of this total will be approved for shipment out of the country by the Office of International Trade.

Latest Government Appointments

Washington has recently announced the following appointments in defense and related agencies:

Herbert Johnson, Jones & Laughlin Steel Corp. official, this week, took over as director of NPA's Iron and Steel Div. Stepping up from the job of deputy director, he succeeds Wallace B. Quail, of Armco Steel Corp.

Roger E. Allen, acting director, Office of Materials, SDPA;

Paul B. Andrews, deputy director, Copper Div., Metals & Minerals Bureau, NPA;

William L. Campbell, deputy administrator for production, DPA, and chairman, Production Executive Committee, DPA;

Richard C. Dyas, acting director, Office of Loans, SDPA;

Russell A. Moody, director, Standards Agency, Munitions Board;

Thomas N. Peck, deputy director, Aluminum & Magnesium Div., NPA;

Harry E. Pontius, director, Office of Field Operations, SDPA;

Steel Arbitration Not Happy Ending

Neither side bound by WSB decision on wage, benefits dispute . . . Mediators listed . . . Military squabbles on cutting up budget pie . . . Congress stiffens on spending—*By G. H. Baker.*

Government's role in the steel wage dispute has switched abruptly from one of observation to determined and aggressive arbitration.

Appointment of the six members of the special Wage Stabilization Board panel to investigate and recommend settlement of the labor-management dispute does not necessarily mean either agreement or settlement of the hotly-contested wage and benefit issues, however.

Spokesmen for both labor and management still are miles apart on many of the issues raised by Phil Murray's CIO-USW (see p. 38) and the WSB panel realistically admits that it may not be able to prepare its final report before Feb. 1.

Arbitration Roster—Here's the line-up on the three-sided investigation panel, which is headed by Harry Shulman, Yale University law professor:

Industry members: John Curry Bane, Jr., attorney for Reed, Shaw and McClay, of Pittsburgh, and Admiral Earl W. Mills, president, Foster-Wheeler Corp., of New York.

Labor members: Eli Oliver, economist for railway labor organizations, and Arnold Campo, of the CIO-USW and a member of the San Francisco regional wage board.

Public members: Ralph Seward, professional arbitrator, and Shulman.

After the panel concludes its investigation, writes its report, and submits it to the WSB, the board, in turn, studies the report and makes its own recommendations to President Truman. Neither the industry nor the union is bound to accept the WSB recommendations.

Services Squabble—The Administration's proposed new budget, ordinarily due at the Capitol by this time each year, will be delayed in going to Congress until late January because of "considerable discussion" over the extent of future military spending.

The White House hints that the delay is due to Army-Navy-Air Force squabbling over how to divide total military funds. President Truman is reported by insiders to have set a ceiling of between $45 billion and $50 billion for the armed forces for the fiscal year starting July 1.

Less But More—Current delay is seen as a clear-cut indication that the three services are in disagreement as to how the pie shall be cut. Mr. Truman reportedly told the Pentagon planners that he was leaving it up to them.

"I'm not the only one who can't balance the budget."

A $50 billion ceiling on military spending would represent a reduction of about $10 billion from the current year's military budget, but larger than the $45 billion predicted early in December by Defense Secretary Lovett.

Gabfest Congress—As far as Mr. Truman's other requests of Congress are concerned, members of both parties feel that he is just "reaching for the moon."

As one Democratic leader puts it: "This session of Congress is going to do more talking and less acting than any Congress in years."

In the Capital corridors, there is considerable talk of bipartisan support for a demand from Rep. Frederic Coudert, R., N. Y., that a ceiling of $71 billion be clamped on federal spending during the coming fiscal year.

Priority on Funds—There is almost unanimous opinion among Capitol Hill leaders that Mr. Truman probably will get all or most of what he asks for in the way of military funds. But his expected request of about $8 billion for foreign aid is something else. The White House and State Dept. will have a nip-and-tuck fight to secure another giveaway appropriation of this size.

Renewed demands for enactment of the Fair Deal program on the domestic front are to be ignored, for the most part. Much talk—and little action—will characterize the White House requests for higher taxes, socialized medicine, and tougher price controls.

Tax Deadline—Bureau of Internal Revenue has extended to Mar. 15, 1952, the tax deadline for many corporations.

All corporations having fiscal years which ended between March 31, 1951, and Dec. 1, 1951, come under the new ruling. Deadline for most of those had been Jan. 15. Others had a deadline of Feb. 15.

FACT:

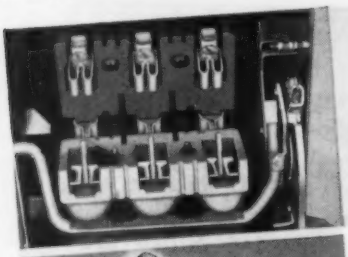
Square D Type A Safety Switches are the overwhelming first choice of industry

REASON:

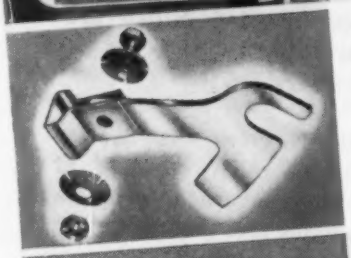
DESIGN LEADERSHIP

PROOF:

a feature-by-feature comparison

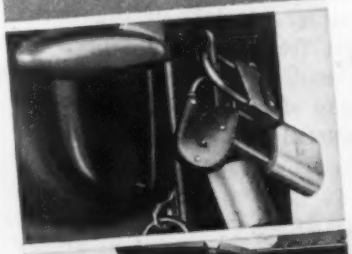


Magnetic Arc Suppressors
"blow out" the arc, contribute to exceptionally high interrupting capacity.

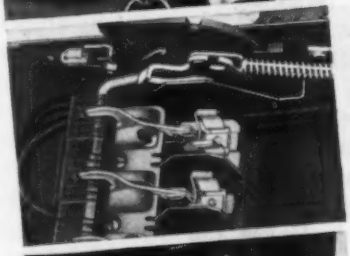


Spring-Loaded Blade Hinges
for pressure contact. **Silver plated** current-carrying parts. Not flash plated but completely plated to reduce temperature rise.

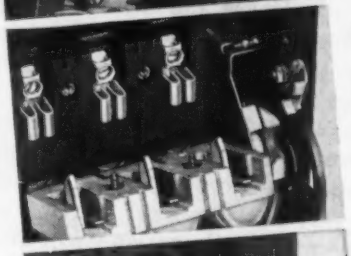
Positive Pressure Fuse Clips
reduce heating at fuse contacts 60% or more.



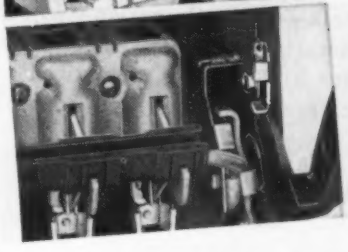
Padlock Attachment
locks switch "ON" or "OFF" with 1, 2, 3 or 4 padlocks of virtually any shape or size.



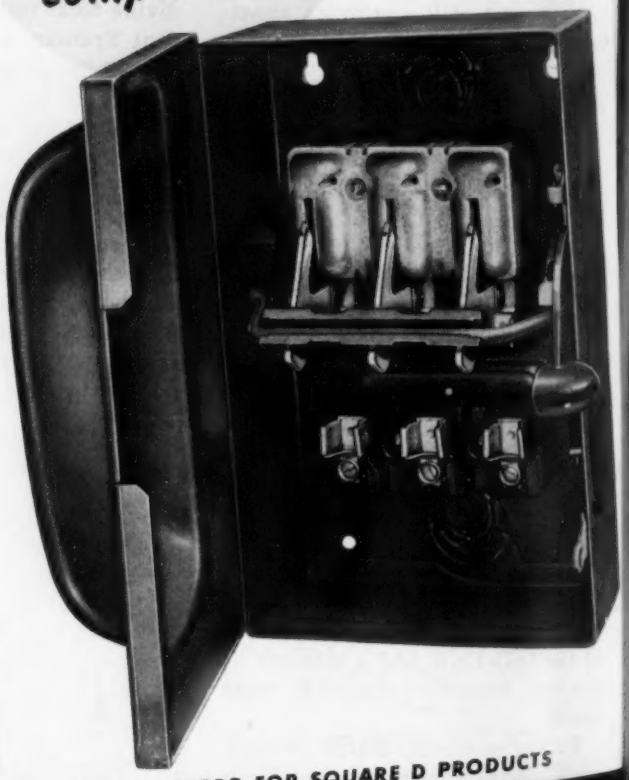
True Quick-Make, Quick-Break
Mechanism design makes it impossible to retard or to "tease" the operation.



Dead Front
construction. All exposed parts are dead when switch is in "OFF" position. **Hinged Arc Barrier** makes it easy to reach line terminals.



Full Cover Interlock
Switch cover can be opened or closed by authorized personnel without removing parts or interrupting service.



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AUTOS: Task Force Studies Cutbacks

Detroit awaits decision on lower output . . . Industry, labor protest in Washington . . . Task force report due before Jan. 12 . . . Unemployment may influence decision—*By A. K. Rannells.*

Automotive manufacturers this week gloomily awaited final decision by control officials on second quarter metals allocations which will determine how much production must be cut back. Decision is due not later than Jan. 12. (See p. —.)

Original plans called for a reduction in allotments of brass mill products to about 44 pct of pre-Korean levels. The cutbacks mean a reduction of passenger car production to about 800,000 units a quarter or just a little better than 50 pct of 1950. Industry had expected a level of 1 million units.

Protest Group—Industry and labor came to a meeting with Mobilizer Wilson and Controls Chief Fleischmann to protest the pending cuts. A task group was named and told to report back to Wilson this week after taking an impartial look at the matter.

Control officials are between the devil and the deep. On the one hand is the fast-rising demand for steel and the critically short copper, brass and aluminum for defense and related purposes.

As Wilson and Fleischmann see it, the automotive industry is the only source of sizable tonnages of extra metals. Most other types of consumer durables, using smaller quantities industry-wise, have already been cut back to around 50 pct levels.

More Firing? — On the other hand, the already serious unemployment situation in the mid-West, particularly the Detroit area, is certain to be aggravated greatly by such a cutback. Present and foreseen defense contracts to automobile and parts plants simply will not take up the slack, labor and management say.

Auto makers and the CIO United Auto Workers agree that something like 164,000 automobile workers are now unemployed as a result of previous cutbacks. The UAW predicts that this figure would be swelled to 300,000 by spring if the proposed additional cutback goes through.

An appeal is being made to the Comptroller-General for permission to grant special treatment to distressed areas like Detroit. This would allow procurement officers to place defense contracts in unemployed areas regardless of low bidder.

Defense Not Enough—But the union believes that this would fall far short of taking up the slack.

Return to Sender—Fast!

In these days of mink coats, deep freezes, etc., Washington officials are even suspicious of packages from the White House. During the Christmas rush, a package was forwarded from the Executive Mansion to Defense Production Administrator Manly Fleischmann.

When he saw that the shipper was a manufacturer who regularly files allocation applications with NPA, the controls chief shied away in horror. His first thought was to return the package unopened. But his curiosity and that of his staff got the better of his uneasiness.

Inside were samples of the manufacturer's product and his letter requesting White House aid in getting a supplemental aluminum allocation. Also enclosed was a brief note from 1600 Pennsylvania Ave., pointing out that this was Mr. Fleischmann's own little problem. It also suggested that the samples be returned.

It is estimated that switching to defense production may have the effect of reemploying up to 75,000 —leaving the jobless figure at the present 165,000 or more.

Industry cannot figure out why the savings in materials through existing cutbacks will not take care of the "unexpected" demand by defense and related production.

It is pointed out that 1950 production of automobiles and trucks amounted to nearly 8 million vehicles. Under the original plan for allowing 4 million passenger cars and 1 million trucks, the cutback is estimated to result in a savings of 5,000,000 tons of steel and 204,000,000 lb of copper.

Truck Cuts? — A particularly hard decision to make will be how much, if any, truck production should be cut for the second quarter. Allocations for the first quarter were on the basis of 240,000 vehicles. This is the lowest figure to which Defense Transportation Administration believes production can be cut without a serious threat of a breakdown in highway freight transport.

Regardless of the decision as to allocations and production levels, a readjustment of percentage-by-industry ratings will be made and will become effective Apr. 1.

Automobile manufacturers receive their individual metals allotments on the basis of this rating. The revised rating is based on factory sales in 1947-49 and reflects competitive positions of the companies and new cars introduced since June 1950.

Auto Ratings — Suggested amendment to NPA order M-68 may set following industry rankings:

Company	Old Percentage	New Percentage
Checker Cab	0.10	.08
Chrysler Corp.	21.65	21.43
Crosley Motors	.35	.21
Ford Motor Co.	21.35	21.00
General Motors	41.35	41.00
Hudson Motor Car Co.	2.95	2.93
Kaiser-Frazer	1.55	2.47
Nash-Kelvinator	3.30	3.45
Packard Motor Car Co.	2.15	2.09
Studebaker Corp.	4.25	4.13
Willys-Overland	1.00	1.21

—14-1580

Industrial Briefs

New Department—General Electric Co.'s Chemical Div. has announced the formation of a new department, the Silicone Products Dept. DR. CHARLES E. REED has been named general manager.

New Company—The STUART STEEL PROTECTION CORP. has been formed to sell cathodic protection supplies in the East. Linden Stuart is board chairman and Linden Stuart, Jr., president. Offices and warehouse are at 2 Mark Road, Kenilworth, N. J.

Program Completed—Completion of a $25,000 expansion program for increased production of lithium aluminum hydride, lithium borohydride, sodium hydride, and sodium borohydride has been announced by METAL HYDRIDES, INC., Beverly, Mass.

Closed Out — FARM PRODUCTS DIV. of Tennessee Coal, Iron & R. R. Co. as been discontinued.

Plant Planned—MONSANTO CHEMICAL CO. has announced it will build a chlorine plant with a capacity of 25 tons a day at Anniston, Ala. As by-products the plant will produce hydrogen and a rayon-grade caustic soda.

Brochure Published—A new brochure published by Electrofilm Corp., 7116 Laurel Blvd., No. Hollywood, Calif., describes the uses, application and characteristics of FILM-TYPE HEATING ELEMENTS.

Meeting Scheduled—First midwinter meeting in 25 years of the AMERICAN SOCIETY FOR METALS will be held Jan. 31—Feb. 1 at the William Penn Hotel, Pittsburgh, Pa.

Buys Control—Effective stock control of Alloy Precision Casting Co., Cleveland, has been purchased by MERCAST CORP. of New York. S. J. Sindeband, executive vice-president of Mercast, is president of the Cleveland firm.

Absorbed—Effective Jan. 1. subsidiaries of SHARON STEEL CORP. were liquidated into the parent company and will operate as divisions. No change in personnel or management policies was involved.

Ho Hum—According to Radio Prague, the Skoda Works has been renamed the LENIN WORKS.

Retired—DR. FRANCIS C. FRARY, director of research, Aluminum Corp. of America, retired Jan. 1. Known as the founder of organized research in the aluminum industry, he holds more than 30 U. S. patents and is author and co-author of numerous books and papers on metallurgy and chemistry.

Money-Saver — The ATLANTIC & WESTERN R. R. CO. reports it has increased revenue while saving more than $700 per month on fuel since replacing two steam locomotives with a single General Electric diesel-electric 70-ton switcher.

Appointed—Baldwin testing equipment sales in the Pittsburgh area were assigned Jan. 1 to P. J. SLAVISH.

Forms Subsidiaries—Dow Chemical Co. has formed two new wholly-owned subsidiaries, DOW CHEMICAL INTER-AMERICAN LTD. and DOW CHEMICAL INTERNATIONAL LTD., to take over the functions of Dow's present export department. Clayton S. Shoemaker has been named president of both companies.

"Even the heat-treat chart goes wild."

New Address—THE J. F. TAPLEY CO. has moved to 32-01 Queens Blvd, Long Island City, N. Y.

Plant Expansion—A $5 million plant expansion program has been announced by HOOKER ELECTROCHEMICAL CO. Work will begin immediately at the company's Tacoma, Wash., plant.

Merger—Shenango Tube Co., Sharon, Pa., and Agaloy Tubing Co., Springfield, Ohio, combined Dec. 31 to form the SHENANGO AGALOY TUBE CO. with principal offices in Sharon. The Springfield plant will continue as the Agaloy Div. of the new company.

In Operation—OLIN INDUSTRIES INC. has announced that its new Covington, Tenn., electrical division plant will soon begin producing dry cell batteries for the Signal Corps.

Buys Plant — Northern Equipment Co.'s Erie, Pa., plant has been sold to ERIEZ MANUFACTURING CO. Northern's operations are being transferred to the old Talon Co., Inc., plant in Erie.

Plans Expansion—PACIFIC GAS & ELECTRIC CO. plans to spend $162 million for facilities expansion in 1952. About $132 million will be spent on electrical facilities, the remainder going for gas facilities and other properties.

Nickel Saver — In the interests of nickel conservation for defense purposes, the Royal Canadian Mint is now making its 5¢ coin from cold-rolled strip steel supplied by STANLEY STEEL CO., LTD., Hamilton.

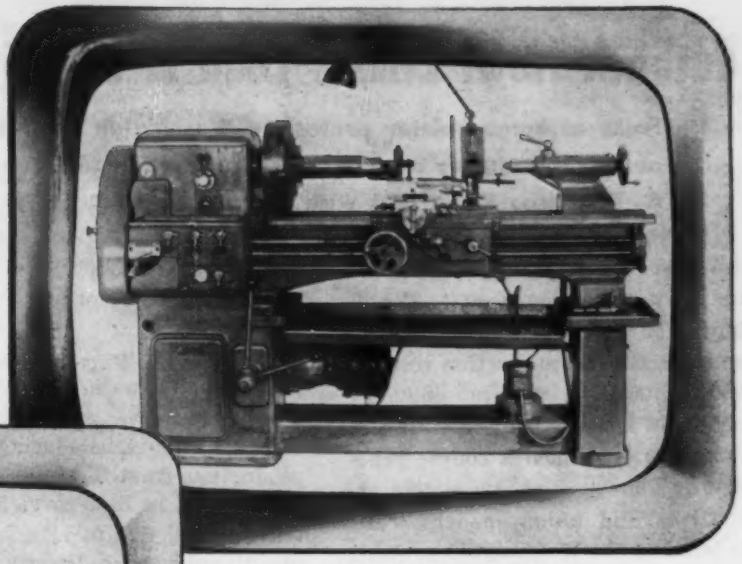
Yard Bought—Bethlehem Steel Co.'s Atlantic Works shipyard in East Boston, Mass., has been sold to S. D. HICKS & SONS CO. of Hyde Park, Mass. Renovation of the yards is scheduled to start soon, and production of defense goods is planned to begin this spring.

Loans—Small Defense Plants Administrator TELEFORD TAYLOR has reported that eight firms already have applied for SDPA assistance in obtaining loans totaling nearly $3,500,000 to carry on defense work.

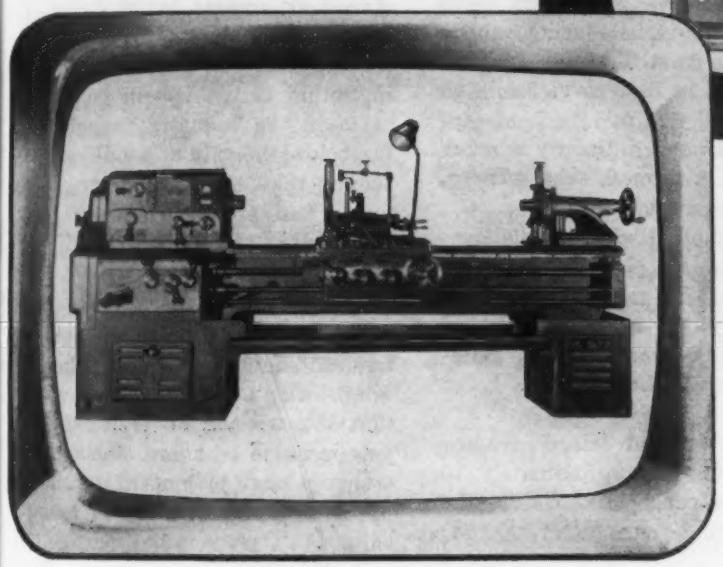
The Machine Tool Picture is Good...

Look at DIMCO First!

- **IMMEDIATE DELIVERY**
- **NO PRIORITIES NEEDED**
- **HIGH PRECISION!**



13" DIMCO Engine Lathe
(Geared Head) Model DBC 175



17½" DIMCO Engine Lathe
(Geared Head) Model M.M.C.L. 225

DIMCO

- **ENGINE LATHES**
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Pictured are just two of the rugged DIMCO lathes that incorporate every desirable feature . . . Spindles of special hardened and ground alloy steel . . . A large range of spindle speeds (V-belt drive) at the immediate command of the operator . . . Special friction clutch for instantaneous starting, stopping and reversing . . . Speed change gears that slide on splined shafts . . . Coolant pump supplied complete with motor, piping and basin.

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Cutback Howl Echoes Loud in Detroit

Folks at home bolster protest in Washington just as vigorously . . . Industry awaits decision on production quotas . . . C. E. Wilson fights cuts with facts, figures—*By W. G. Patton.*

While representatives of the auto industry and union went to Washington to protest lowering of second quarter car production to 800,000 units (see p. 57), industry people in Detroit made their arguments against such a course vehemently known. Top automotive executives and union leaders were bolstering the Washington protest, arguing that the motor car industry has been more grievously injured by defense cutbacks than any other.

The industry is on pins and needles awaiting the Jan. 12 decision of a special Washington study group. It will announce the number of motor vehicles that may be built during the second and third quarters of 1952.

Loud Echo—C. E. Wilson, president of General Motors, in Washington voiced sentiments at home. He spoke strongly against further auto cuts. He argued that further reduction in automobile production will not result in production of one more gun, tank or airplane in the second quarter of next year than will otherwise be produced. Wilson said the current level of production in the automotive industry has already resulted in substantial unemployment in Michigan.

"Reported further cuts contemplated by NPA for the second quarter could well be a catastrophe for the working people of Michigan," Wilson argued. "The singling out of the automotive industry amounts to national discrimination against the people of Michigan."

Reducing automobile and truck production by another 20 pct will amount to a "political, economic and social crime," Wilson told the automotive conference.

Facts, Figures—In his Washington appearance C. E. Wilson documented his arguments with facts and figures. Reducing vehicle production from 8 million in 1950 to 5 million in 1952 saves 5 million tons of steel, 174 million lb of copper directly and indirectly another 30 million lb through substitutions, the GM spokesman said.

Wilson made it clear to the committee that if a 37½ pct reduction is ordered in vehicle production during 1952 the industry will need $6 billion in defense orders to maintain its position.

Sign of Demand—Used cars are today selling at approximately 70 pct of new car prices. Before the war, a good 2-year-old car sold for approximately 55 pct of the price of a new car. Used car prices have traditionally been an excellent barometer of the strength of the automotive market.

"Fenders was how I lost my first husband."

Union Pitches In—If industry can prove its case, government threats usually vanish. This has happened so many times it is almost a pattern.

The automobile industry has strong arguments in its favor. It is backed by labor. To many observers who have watched Washington in action it will be a surprise if the industry is cut very far below the rate of a million passenger vehicles per quarter. This figure had previously been widely accepted as the minimum.

Selling Facts—Economy is uppermost in the mind of a prospective automobile purchaser. The latest Crowley-Collier survey discloses that 42 pct of car buyers base their purchases on economy. Included in economy are (1) long life, (2) low purchase price, (3) high trade-in value, (4) more miles per gallon and (5) low cost repairs. Performance was given as specific reason for purchase by only 18 pct of the buyers while 11 pct bought their car because of comfort considerations.

The fact that miles per gallon is only one of five economical aspects of automobile purchase explains why major auto producers have been so reluctant about featuring gasoline economy as a major factor in new car buying.

Profits Barometer—The financial report by Nash-Kelvinator offers a preliminary indication of automotive earnings. For the period ended Sept. 30, 1951, net sales by Nash declined 6 pct. Net earnings totaled $16,220,173 or $3.73 per share compared with $6.64 earned for 1950.

The Nash Rambler made impor-

tant contributions to Nash's excellent financial showing. The Nash appliance business was off from 803,600 units in 1950 to 678,039 units last year.

The substantial reduction in Nash earnings reflects a trend that is already strongly evident in the automobile industry. All car producers are expected to show earnings far below the record-breaking 1950 totals.

Harmony's Sour—One of the stubborn problems confronting Washington is failure of civilian and defense production to mesh harmoniously. As pointed out by E. R. Breech, executive vice-president of Ford, last week, the defense products of the type which Ford Motor has contracted to manufacture require less labor content and more material content than do passenger cars and trucks.

This explains why employment is falling off while the difficulty of getting adequate materials for automobile production is increasing. Ford payrolls have declined 27,500 from peak employment of a year ago. Addition of Federal controls and preparation for defense and normal expansion has increased the number of salaried employees by 6000, Breech said.

Ford Saves on Aluminum

Ford has eliminated 5 lb of aluminum from its automatic transmission. Estimated saving for Ford passenger car components for the year 1951 was 2,500,000 lb of aluminum.

A number of Ford die castings have been redesigned to steel stampings or iron castings. Headlamp rims and tail-light bodies are examples. In the case of the Ford car, zinc requirements were cut from 30 lb to 24 lb per car. This adds up to an annual saving of 3½ million lb of zinc.

Other metal savings announced by Ford include 3 million lb of copper and 500,000 lb of nickel. The company has also changed its specifications to conserve molybdenum, cobalt and other metallics in short supply.

Money Back on Allstate

Sears, Roebuck in selling the Kaiser-Frazer Allstate car will accept trade-ins and will extend its "money-back" policy to the new car. It will supply its own battery and a full line of accessories including radio, heater and directional signals.

Plans for servicing the cars for owners have not been announced. And it is not yet clear whether Sears will wholesale or retail its trade-ins.

Allow 3 to 6 Pct Auto Hikes

Capehart Amendment increases in wholesale prices of Ford, Lincoln, and Mercury passenger cars are expected to produce retail increases of about the same percentage of price—between 3 and 6 pct.

Price hikes allowed Ford are lower than the company asked of Office of Price Stabilization. Retail ceiling increases are estimated at from $65 to $104 on Fords, $67 to $86 for Mercuries, and $130 to $201 for Lincolns. These hikes would have to be approved by OPS.

Ford is the second auto firm to get a wholesale increase of the Capehart type. Hudson was the first, obtaining approval of a 4.89 pct rise.

Completes Tank Pilot Plant

Chrysler has completed its first pilot model tank at the Newark, Del., plant. Details of the heavy tank are still under security restrictions. All major construction on the 900,000 sq ft plant has been completed. An office building, paint shop and repair shop are under construction.

About 650 workers are employed. Employment will probably reach 3000. Chrysler will assist Ordnance in the development of the new heavy tank and will design a medium tank for production at the Newark plant.

THE BULL OF THE WOODS — **By J. R. Williams**

AN INSPECTOR IS TH' WORLD'S MOST THANKLESS JOB! THAT POOR GUY'S GOT THAT HAUNTED LOOK--EVERY TIME ANYBODY POINTS IN ANY DIRECTION, HE THINKS IT'S AT HIM!
YEH, HE'S AFRAID OF FINDIN' A MISTAKE AND AFRAID THAT HE WON'T! IF YOU TRY TO RUN TWO WAYS VERY LONG, YOU BECOME A KIND OF SPLIT PERSONALITY, OR CRACKED!
1-11
J.R.WILLIAMS
T. M. Reg. U. S. Pat. Off.
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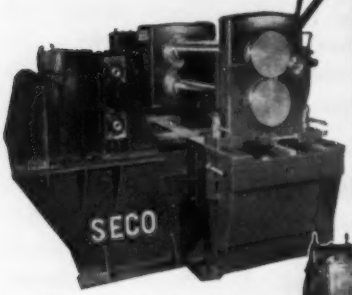
REVOLUTIONARY NEW DESIGN

YOU CAN *Change Knives in 10 Minutes* on this New SECO SLITTER



View showing front housing in operating position.

This 48" pull-through type SECO Slitter makes 7 cuts in .125" material at 300 FPM or 24 cuts in .030" material at 900 FPM. Arbors are 6" in diameter, taking 8½" dia. sleeves and using 14" dia. knives.

Modern, Efficient Slitter Saves Hours of Down Time

With this new SECO Slitter, the complete slitting knife assembly can be changed in only a few minutes—saving many hours of lost production time. Cutters and spacers are pre-assembled on sleeves. To change jobs, the slitter front housing is moved on to a shelf which swings out—giving the operator free access to the knife assembly. The sleeves with the old knife assembly are removed, and the new sleeves and assembly—ready for immediate producfion on the next job—are placed on the arbors.

This ingenious and cost-saving idea is only one of the many superior features which can be built in to SECO Slitters. Another is the use of eccentric arbor mountings with Timken tapered roller bearings. This gives a constant pass line for any knife diameter. These modern design and new engineering features make SECO Slitters outstanding in handling the "tough" jobs—where quality, accuracy and speed are major factors.

Efficient SECO equipment is ruggedly built for trouble-free slitting on sheet up to 72" wide—any number of cuts. For more information on SECO Slitters, write today. Our engineers will be glad to furnish full details and operating data—with no obligation to you.

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Scrap Baling Capacity Increases

New presses installed since OPS named the bundle as scrap price base . . . Interest in street car rails grows . . . Military scrap risky . . . More aluminum planned—*By R. T. Reinhardt.*

Once lowly bundles of scrap are coming into their own in the West with a vengeance.

Since OPS named the bundle as the base for all steel scrap prices baling presses are being installed as fast as possible to utilize whatever light scrap goes to dealers.

Southern California has had four or five large presses for several years and San Francisco has had four which were able to handle all needs. However, in the Pacific Northwest this phase of scrap recovery had been neglected.

Changes Made—Things are different now. Seven dealers in that area have or soon will have presses in operation—some with the aid of accelerated tax amortization. Among these are Sternoff Metals, Seattle Iron and Metal, Dulien Steel Products, Tacoma Junk Co., Pacific Iron and Metal Co., California Bag and Metal Co., and Schnitzer Steel Products, Inc.

No doubt some of the impetus toward baling is the recent order of NPA to auto wreckers to clean out their yards, but brokers and dealers in the know believe the need for more presses was apparent long before that.

Buyers are a little shy about taking No. 2 bundles because of some unpleasant experiences with dirty material, and have kept charges of this material as low as possible. However, scrap is scrap and even No. 2's will find a ready market.

Generally Northwest scrap buyers are happy to see the presses coming in and believe they will be of substantial aid in solving their scrap shortages.

Probing for More—With scrap so scarce there is a growing interest in abandoned street car rails in western cities. Last month THE IRON AGE reported that San Francisco has about 14,000 tons of abandoned track and last week the Los Angeles city engineers told us that there were more than 25,000 tons of rails lying on and beneath Los Angeles streets. About one-third of the street car rails are above street surface.

Bids for removal and purchase of these rails have been too low to interest the city fathers because of high repaving costs in spite of bonuses allowed by Office of Price Stabilization.

Watch Your Step—Overseas military scrap continues to pose a threat to operators of steelmaking furnaces. Several deaths have occurred in Northwest operations from charges containing explosive material and last week an explosion in one of the 50-ton electric furnaces of Bethlehem Pacific Coast Steel Corp. at Los Angeles was attributed to that cause. Thirteen workmen were burned, two heats were lost and property damage was estimated at $5000.

This material is checked three times but something got by. The company is now erecting steel plate sheathing to protect workmen in otherwise exposed positions as an additional safeguard.

CONSIDERATE: To shield off a welding operation which constituted a safety hazard and a source of annoying glare for nearby workers, this welder at The National Supply Co.'s Torrance, Calif., plant constructed a steel box around the job location. Bails or half-rings are being welded to gun tubes to facilitate suspension in the vertical heat-treating furnace.

More Aluminum Fabrication—What has appeared to be an obvious need and opportunity in the Los Angeles area apparently will at least partially be met in the near future by Revere Copper & Brass Co. and Reynolds Metals Co.

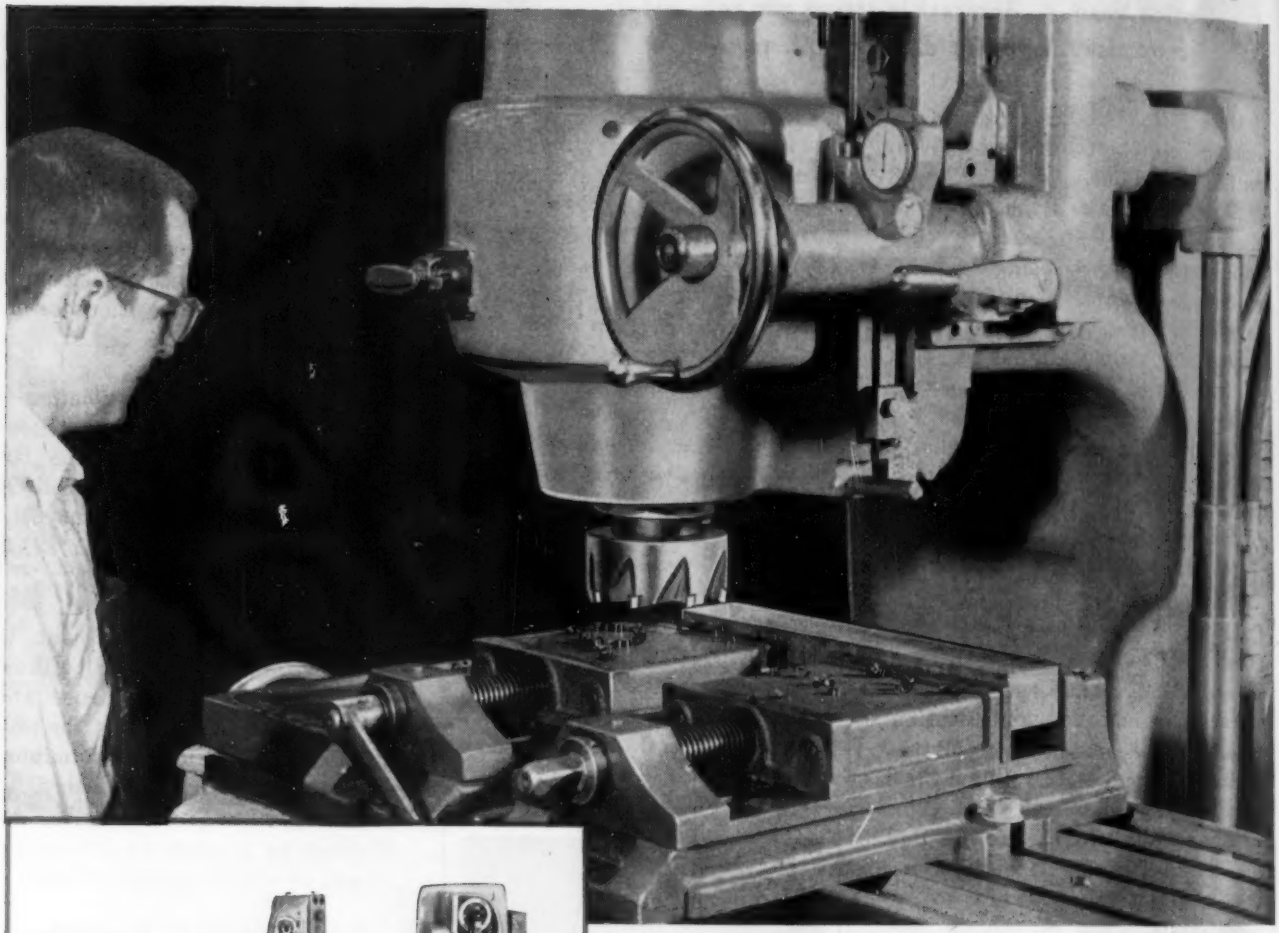
Revere has announced plans to double the size of its plant to include fabrication of aluminum tubing and extruded shapes and Reynolds will build a plant for production of fabricated aluminum parts for the airframe industry. As previously announced here, Harvey Machine Co. is expected to increase output of aluminum extrusions.

More Aluminum Production—Olin Industries, Inc. is seeking an allotment of 80,000 kw firm and 40,000 kw interruptible power from Bonneville Power Administration for a proposed aluminum reduction plant near The Dalles, Ore. This is one of the proposals which has been in the wind for some time with informed sources reporting it doubtful of success. However, latest information is that completion of the plant is contemplated in 1956 when the power picture will be considerably improved with completion of The Dalles Dam in Oregon and Hungry Horse Dam in Montana.

Alcoa is progressing with construction of its reduction plant at Wenatchee, Wash., with steel to go up next month and accessory equipment to be installed later.

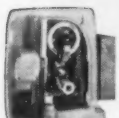
FACTS TELL THE STORY...

NEW KEARNEY & TRECKER CK MILLING MACHINE CUTS PRODUCTION TIME 75%



C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

New CK column easily absorbed vibration from heavy cutting load.

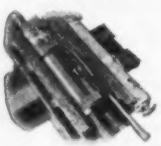


Greater horsepower permitted maximum results from modern cutter.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅜" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.

CK's 3-bearing spindle and flywheel assured fast metal removal, excellent finish.

CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.



CK's positive, metered lubrication assures trouble-free operation.

The FACTS on this job are:

Operation: Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia., 8 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm **Depth of Cut:** ¼"
Table Feed: 25 ipm **Machining Time:** 3.8 minutes
Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

It will pay you to see the new CK line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Tool Users Stress More Productivity

More details on Society of Tool Engineers survey . . . Tool users seek more productivity, say shut down time is over long . . . November new order index drops—*By G. Elwers.*

What do the users of machine tools want in the equipment they buy? The American Society of Tool Engineers has been polling production executives and engineers to find out, and has come up with some interesting answers.

Increased output was of course frequently mentioned. But it did not predominate. Higher productivity was named as the primary concern of most of the machine tool users who answered the questionnaire.

Objections—Half of the replies said that machine tools have to be shut down for too long a time, particularly for tool changes. One quarter of the answers expressed dissatisfaction with operating speeds and loading methods.

Accuracy was also mentioned as a point where improvement is desired. Four out of every ten replies expressed a desire for greater rigidity and more accuracy in machine tools.

Changing Speeds—On the other hand, the survey indicated industry is satisfied with the smoothness and ease of changing speeds of the equipment it buys. Only one out of ten replies indicated these as shortcomings.

Universal accord on all answers was noted, despite their coming from large, medium, and small companies.

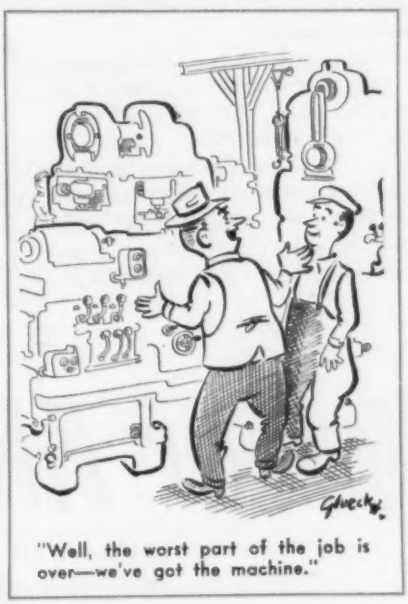
New Parts Plant—Warner & Swasey Co., Cleveland, will construct a new $1.5 million plant in New Philadelphia, Ohio, for manufacture of machine tool parts.

It is hoped that the plant can be completed and in partial operation by June. This step, plus subcontracting is expected to up Warner & Swasey's output by at least 50 pct.

Dip in November—Preliminary data from the National Machine Tool Builders' Assn. indicates the volume of new orders took a substantial drop in November. Coupled with a rise in shipments, this caused a small decline in the ratio of unfilled orders to shipments.

The new order index dropped to 332.6, by far the lowest figure for any month of 1951. Shipments continued their steady rise, going from 221.3 in October to 225.7 in November. The unfilled order ratio dropped from 22.2 in October to 20.8 in November.

This is the second month in which the industry's backlog, as expressed by this ratio, has declined from the year's high of 23.5 registered in September. It brings the unfilled order ratio down to about where it stood in mid-1951.



"Well, the worst part of the job is over—we've got the machine."

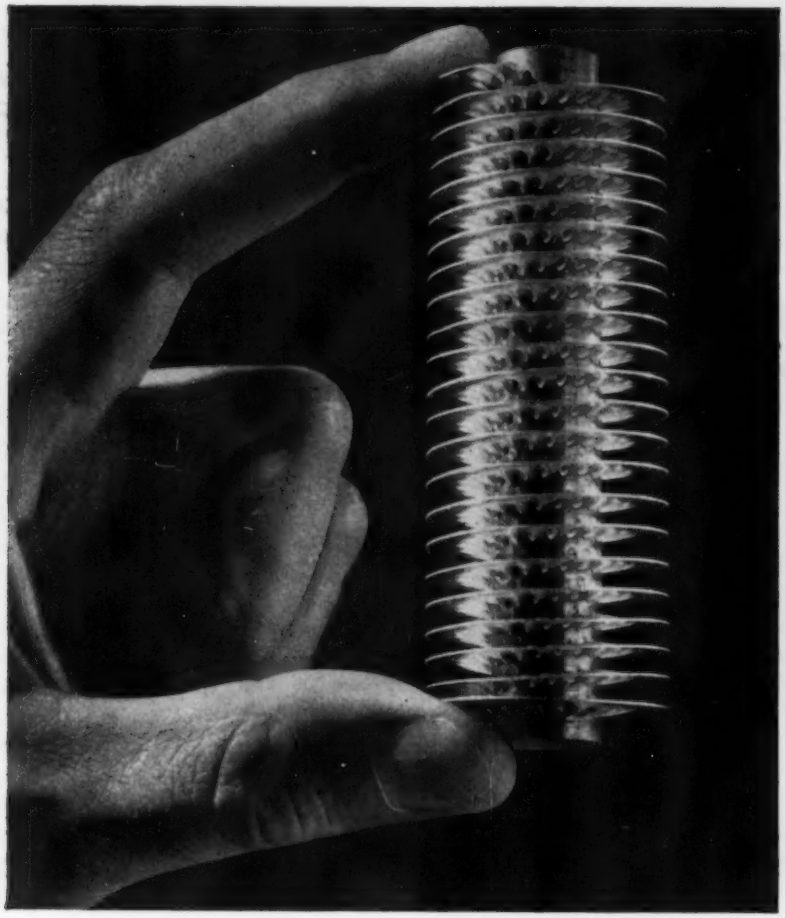
No Help on Labor—With manpower one of the major blocks to increased machine tool production, many tool builders are looking to Washington for help, and finding the reality doesn't always match the promise.

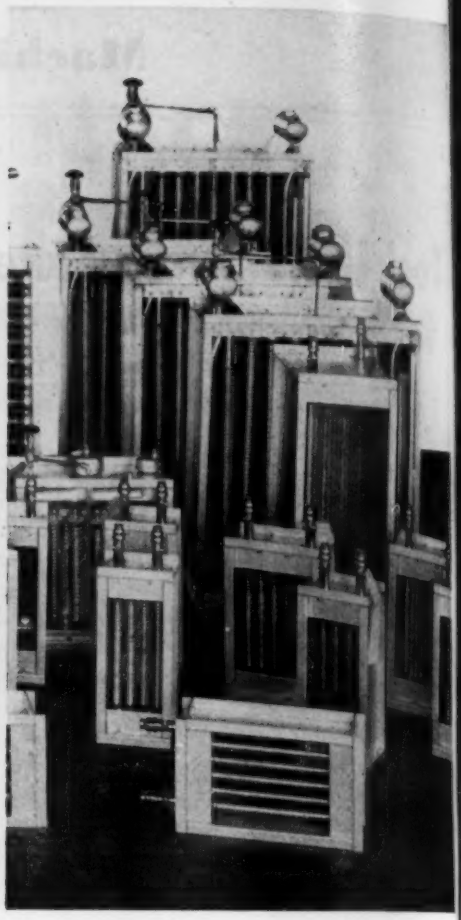
The Machinery Section of NPA is known to favor letting machine tool builders raise their wages enough to meet the competition from higher-paying direct defense plants. But there is evidence that the Wage Stabilization Board hasn't yet been convinced of the importance of allowing such raises when asked.

"Wait Your Turn"—Weeks are required, despite the critical need for machine tool labor, before WSB considers wage increase petitions. When one machine tool builder asked the WSB to consider his petition immediately and out of turn, the answer was "no." "Your petition will be considered . . . in its regular turn," said WSB, adding, "Your situation is not unlike those in other establishments which have filed for wage adjustment. . . ."

This latter phrase seems to indicate that, to WSB, the machine tool industry is still no more important than any other. This opinion is not shared by top defense officials, who have raised the industry to equality with the AEC and direct military contractors in priority rating for materials and components.

Prices Follow Wages—Wages in the British machine tool industry have recently been raised. And now, in compensation, prices are being upped 7 to 10 pct. Even at the new levels, importers say, British tools are still competitive in price with their U. S. counterparts.





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In addition, aluminum is so *formable* that complex forming, crimping and pressure-winding operations are possible at low cost.

Durability of these stretched and compressed aluminum coils is demonstrated by the fact that they maintain a tight bond to the tube after more than eight years' service. Also contributing to this long life is aluminum's *high resistance to corrosion.*

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The Iron Age

SALUTES

Robert W. Wolcott

He's leading the fight to get out dormant scrap . . . Alerting industry to its stake in steel output.

BOB WOLCOTT, chairman of the board of Lukens Steel Co., is a scrapper. He enjoys a good fight and right now he's having the time of his life. He's a one-man battalion campaigning to get dormant scrap iron and steel out of industry's attics so steelmaking will not lag while America rearms.

Big, solid, determined Bob Wolcott has become a familiar figure at trade conventions. He's carried his fighting message to groups, buttonholed executives, talked to the press to alert industry and business to the need for more scrap.

Steelmill stockpiles have stayed famine-shrunk but steel production has not faltered. Bob Wolcott, as chairman of the Steel Industry Scrap Mobilization Committee, has proved the steel industry fights its own battles. For his efforts he merits a resounding commendation.

Bob's life and ambitions have centered in Pennsylvania. He attended Lehigh University, worked for Bethlehem, and joined Lukens in 1922. In 1925 he became president of Lukens and in 1949 moved up to chairman of the board. He finds time and energy to be active in many other business and civic organizations.

He was a lieutenant commander in the Navy during World War I. During World War II he was steel consultant to the War Production Board. He was also liaison representative of the Dept. of Commerce for return of scrap from foreign countries.

Bob modestly says one of his chief claims to fame is that his son Bob, Jr., was a pitching ace for Princeton University. His hobbies include gardening, hunting, riding, and pleasing six grandchildren.

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The Iron Age INTRODUCES

Clarence B. **Randall**, president, INLAND STEEL CO., Chicago, designated chief executive officer. **Joseph L. Block**, elected executive vice president and chairman of the finance committee. **John F. Smith, Jr.**, former general manager of sales, elected vice president in charge of sales. L. E. Block, one of the founders of the company, elected honorary chairman of the board. **Harold B. Ressler**, of Joseph T. Ryerson & Son, Inc., elected a director.

James H. Ingersoll, vice president, BORG-WARNER CORP., Chicago, is now in charge of all contract and defense sales. **A. J. Robertson**, new manager of defense sales, and **L. R. Miller**, new manager of contract sales.

Louis M. Fehrenbach, formerly vice president and general manager, elected president and general manager, INDIANAPOLIS DROP FORGING CO., INC., Indianapolis.

John F. Schmitt, appointed executive vice-president, GARY STEEL SUPPLY CO., was formerly assistant to manager of sales, Industrial Div., U. S. Steel Co.

J. W. Gruber, appointed vice- president and general manager, KNAPP BROS. MFG., CO., Cincinnati. **Tom Lehman**, appointed vice-president, engineering; and **R. C. Meier**, sales manager.

Dr. Lauriston C. Marshall, appointed director of LINK-BELT CO.'S new physical testing and research laboratory, Indianapolis.

Frank L Johnstone, appointed assistant comptroller, UNITED STATES STEEL SUPPLY CO., Chicago.

Robin S. Kersh, elected executive vice president, WESTINGHOUSE ELECTRIC INTERNATIONAL CO. He succeeds **E. V. Huggins**, recently named Assistant Secretary, U. S. Air Force.

William E. Crocombe, appointed assistant to the chairman, AMERICAN BRAKE SHOE CO., New York.

Thomas J. Owens and **Archer D. Sargent** have been named assistant comptrollers, NATIONAL LEAD CO., New York. **Winthrop Sargent, Jr.**, was elected a member of the board of directors; **Paul J. Pater**, named manager of the Chicago branch; **Philip W. Ruppert**, appointed assistant manager, metal department; **Michael Uss**, appointed assistant treasurer; **Thomas J. Murphy** has been made assistant secretary.

Howard L. McGregor, newly elected president, NATIONAL TWIST DRILL & TOOL CO.,, Rochester Mich. He succeeds his father, **Howard L. McGregor, Sr.**, now Chairman of the Board.

John W. Dixon, executive vice president, THE CLEVELAND GRAPHITE BRONZE CO., elected to the board of directors. **R. E. Waldo**, appointed general manager of the New Departure division.

Robert A. Graney, appointed to the newly created post of assistant general superintendent, Indiana Harbor Works, INLAND STEEL CO., Chicago. **Victor E. Schlossberg**, appointed assistant general superintendent in charge of operating services. **Arthur L. Schroeder**, becomes assistant chief engineer, field, and **James M. Howard**, becomes assistant chief engineer, design.

EDWARD R. ANDERSON, appointed president American Forge Div., American Brake Shoe Co., New York.

HAROLD B. RESSLER, becomes chairman, executive committee, Joseph T. Ryerson & Son, Inc., Chicago.

DR. KENT R. VAN HORN, appointed director of research, Aluminum Co. of America, Pittsburgh,

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Personnel

Continued

Benton J. Willner and **Clarence L. Holmberg**, appointed general managers of sales, INLAND STEEL CO., Chicago. Other appointments include **Keneth J. Burns**, manager sales, sheet and strip div.; **Robert M. Buddington**, Chicago district sales manager; **Harry R. Johnson** and **James C. Fausch**, assistant managers of sales, sheet and strip div.; **Derrick L. Brewster**, assistant manager sales, bar and semi-finished div.; **John G. Mack, Jr.**, assistant to Chicago district sales manager.

William L. Naumann succeeds **T. R. Farley** as general manager, Joliet plant of CATERPILLAR TRACTOR CO., Peoria, Ill. Mr. Farley will go to New York where the company is building a large plant.

E. V. Erickson, elected President, KELLER TOOL CO., Grand Haven, Mich. **B. P. Sherwood, Sr.**, elected Chairman of the Board. **R. C. Fenner**, Vice President, and **B. P. Sherwood, Jr.**, Secretary-Treasurer. Directors elected are **B. P. Sherwood, Sr., W. R. Loutit, Hunter S. Robbins, R. C. Fenner, B. P. Sherwood, Jr., E. V. Erickson, Lawson E. Becker**, and **Robert M. Ellis.**

Louis H. Albee, appointed manager of advertising and sales promotion for Rocky Mountain district, Apparatus Sales Div., GENERAL ELECTRIC CO., Schenectady, N. Y.

Sherman R. Lyle, named district manager of the steel and tube division, northern Pennsylvania and New York state district, for TIMKEN ROLLER BEARING CO.

Lowell B. Moon, formerly chief of Mineral Div. of U. S. Bureau of Mines, joins exploration staff of KENNECOTT COPPER CORP., New York. **L. S. Breckon** promoted to district geologist, with headquarters in Sydney, Australia.

Alfred L. Boegehold, named assistant to the general manager, GM Research Metallurgy department, CMC Corp., New York. **Dr. Robert F. Thomson**, succeeds **Mr. Boegehold** as head of metallurgy department. **Cleveland F. Nixon**, appointed director of process development, Ternstedt Division.

H. M. Arrick, appointed St. Louis district sales manager, ARMCO STEEL CORP., Middletown, O.

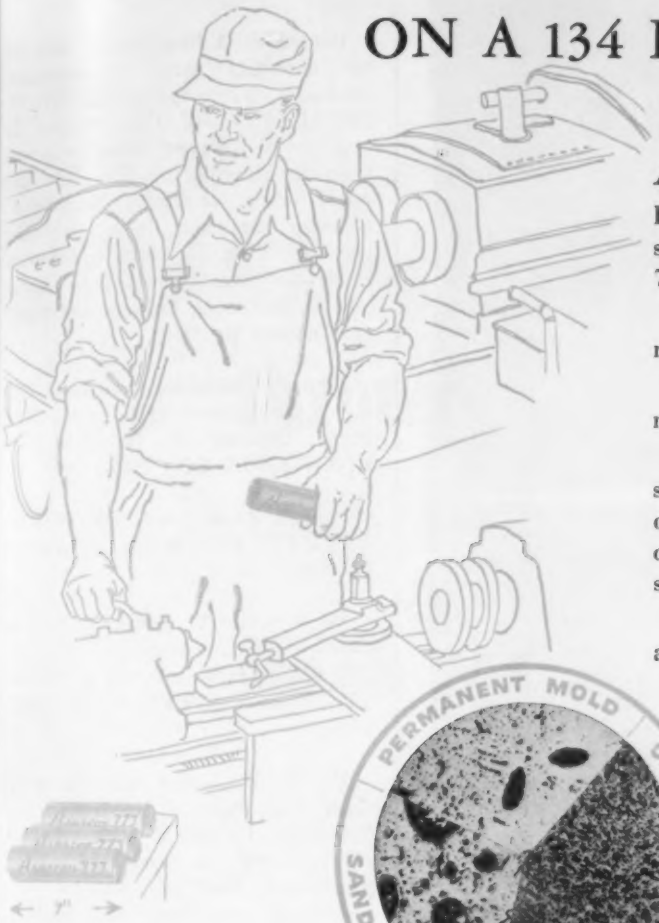
EDWARD A. LIVINGSTONE, elected vice-president, Babcock & Wilcox Co., New York.

LUKE E. SAWYER, elected vice-president, Babcock & Wilcox Co., New York.

C. H. WILLIAMS, appointed assistant executive vice-president, engineering and raw materials, U. S. Steel Co., New York.

ANTHONY M. RYERSON, appointed general manager of sales, Inland Steel Co., Chicago.

60 LBS. OF BRONZE BAR STOCK SAVED ON A 134 LB. JOB!



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Personnel

Continued

Donald E. Ellinghausen, promoted to industrial sales representative, Michigan territory, by KEYSTONE STEEL & WIRE CO., Peoria. He replaces **G. Wayne Bruce** who has been transferred to Wisconsin and opper Mich. territory. **Norman F. Gebauer** becomes industrial sales representative, St. Louis, and **Howard Littlejohn** was promoted to similar position in South Chicago and northern Indiana territory.

John E. Didrickson, appointed Middle West representative of the Steel Plant Department, Chicago Office, BLAW-KNOX CO., Pittsburgh.

Paul E. Rapp, joined FOOTE MINERAL CO., Philadelphia, as assistant treasurer.

Dr. Claude L. Benner, president, Continental American Life Insurance Co., elected a director of EASTERN STAINLESS STEEL CORP., Baltimore.

Melvin H. Baker will fill newly created position of chairman, NATIONAL GYPSUM CO., Buffalo, N. Y. **Lewis R. Sanderson** becomes president; **Fred A. Manske**, vice-president, operations; and **Wells F. Anderson**, vice-president, manufacturing.

OBITUARIES

William A. Irvin, former president and a director and member of finance committee of U. S. Steel Corp.

James A. Fafferty, 65, vice-president and director, Union Carbide and Carbon Corp., at Fort Lauderdale, Fla.

C. Cecil Reilly, 59, assistant district sales manager, Youngstown Sheet and Tube Co., at his home in Montclair, N. J.

John Alexander Moore, 81, president and general manager of Warwood Tool Co. for 45 years until retirement in 1937.

Nelson L. Huff, 80, operator of a machine shop in Milford, Mass., for 38 years, Dec. 23.

Dr. Fernand Turrettini, head of Societe Genevoise d' Instruments de Physique and creator of SIP jig borers, at Geneva recently after brief illness.

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Technical Articles

POWER TRANSMISSION

through flexible couplings

No. 1 of a series

by John E. Hyler
John E. Hyler & Associates
Peoria, Ill.

A wide variety of flexible couplings is available for various misalignment problems. Such couplings are not universal joints, cannot correct excessive angular or parallel misalignment. Machines should always be lined up as accurately as possible, leaving full coupling capacity for correction of misalignment which may develop in service. Exception: when slight float of shaft is required. Some couplings have more strength than shafts.

The function of a flexible coupling is to transmit torque from one shaft to another, in cases where limited misalignment may occur. Its further function is to absorb such stresses as may result from misalignment instead of allowing those stresses to be transmitted from one shaft to the other.

When machines to be coupled by flexible couplings are set up, they should be aligned with all possible accuracy. This leaves full coupling capacity for misalignments that may subsequently occur. Such misalignments may be due to strong pull of a heavily-tensioned belt on one of the shafts, or distortions due to temperature variation. It may be the result of wear in bearings, or settling of machine foundations. Any or all these things can occur in moderation after machines have been set up and coupled together. Misalignment may be purely of angular type, or it may be parallel.

There are smooth-torque applications, but there are other applications in which torque is greater at one time than at another. In some instances, drives are actually pulsating. Whatever the conditions to be met, the coupling installed should be of type and size capable of absorbing and withstanding all stresses present. If rotary speed is high, care must be taken to see that the coupling remains in balance.

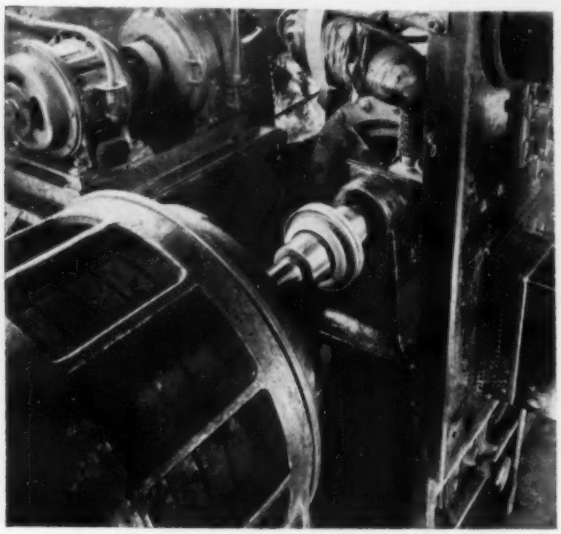
Various kinds of elements are employed to provide necessary flexibility in couplings. In some instances, steel springs are employed to provide power transmission from one member to the other. One type of flexible coupling has two steel discs facing one another. Across the periphery of these discs, parallel axial slots are machined. They are not ordinary straight slots, but are carefully rounded and formed. Wound through these slots, back and forth in serpentine fashion, is a flexible ribbon-like steel spring. This spring can yield to some extent in any direction. In doing so it compensates for misalignment of the running disc members.

Entirely different is a flexible coupling which employs springs in the form of laminated driving spokes. These spokes are free to flex as they will, up to a given limit. One of the coupling flanges incorporates an outer ring. This has internal, evenly-spaced, tapered radial slots. The other member is smaller in diameter, and sits inside of the first. It is provided with firmly held laminated spokes of metal and the outer

ends of these spokes extend into the slots of the outer member. Interposed between these flexible-spring spokes are solid limit spokes.

These limit spokes extend into some of the slots in the outer member. They do not come into driving engagement until the flexible spokes have been overloaded. Then the limit spokes engage, and the drive becomes positive until the overload has been relieved.

This type of coupling allows considerable end play in either shaft without any ill effect. The outer periphery of the coupling is absolutely smooth. It therefore can be used as a brake drum. Thus space is saved that otherwise would be required for a separate drum on mechanisms where a brake is needed.



FLEXIBLE COUPLING of the type transmitting torque by means of a steel ribbon-wound spring. Use of coupling in this generator drive absorbed misalignment.

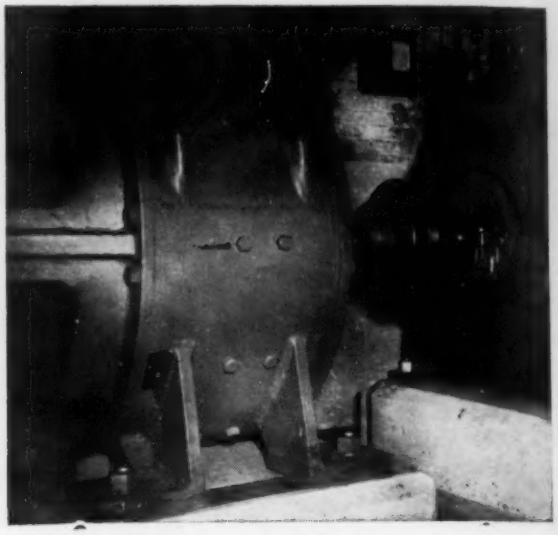
Some flexible couplings employ laminated-type members which, instead of being radial, are parallel with the shaft axes. This is done by drilling a number of evenly-spaced holes through the coupling flanges parallel to their axes. Holes in the two discs are drilled to register. A number of high-grade steel laminations are laid up to form a small bar, square in cross section. This cross section is considerably smaller than the diameter of holes bored through the flanges.

Through use of a cross pin in one of the flanges, and a bushing with a square hole in the mating disc, the two halves of the coupling are actually joined by a number of these flexible, laminated bars. This particular type of coupling provides an effective spring cushion for load shocks and vibrations, and thus gives considerable protection to connected machines.

Certain other flexible couplings also have their two flanges drilled in this manner. Each flange, however, has only half as many holes drilled as the connecting disc. In this way, the two coupling flanges may be alternately bolted to this flexible connecting disc. Such couplings are valuable in eliminating backlash.

Fabric discs have sometimes been used as a central member in such couplings. When this is the case, they have the direction of their fabric threads arranged to vary in different plies for addition of strength. One flexible coupling of this type is provided with a non-metallic composition disc, which provides flexibilty with resiliency and plenty of strength.

These couplings are machined all over. Their hubs are provided with a taper-lock arrangement. The inner portion of the hub is in the form of a key-seated bushing. This bushing is slit through at one point, and is retained in the outer portion of the hub by tapered screws. By driving these screws inward, this inner portion of the hub is clamped on the shaft, which gives it all the firmness of a shrunken fit.



NEOPRENE-impregnated fabric disc is the flexible torque transmitting member in this flexible coupling. Disc is pierced with uniformly spaced openings which engage lugs on flanges.

Certain flexible couplings with intermediate discs do not use pins reaching into the discs from both sides. They are equipped with integral lugs on the faces of the two flanges.

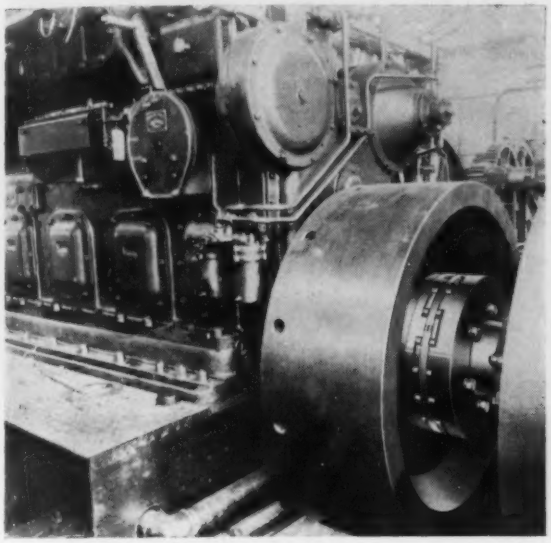
The intermediate disc is usually made of laminated fabric impregnated with Neoprene, although oak-tanned leather discs can be used. It is pierced with ten uniformly-spaced openings which engage the lugs on the coupling flanges.

One type of coupling has an intermediate disc made from heavy fabric impregnated with rubber. The intermediate disc has hemispherical bosses or knobs at each of the bolt holes. The bolts pass directly through the centers of these bosses, which are molded integral with the discs. Hemispherical seats are machined in the inner surfaces of both flanges at all bolt holes. These seats are enough smaller than the hemispherical bosses on the intermediate discs to provide a

clamping action when the bolts are pulled up tightly.

This compresses the bosses inwardly, thereby securely gripping the bolts, and preventing their coming loose at any time. The material is all rubber at the bosses. This type of disc will show no wear in the bolt holes, even after years of service.

Another type of flexible coupling also employs a central flexible member between two coupling flanges. But the disc-type member in the center is made up of a number of thin flexible steel discs. These are punched or drilled with the required holes. To insure against any danger of cracks caused by punching, holes in the steel discs are punched undersize, and later enlarged by grinding.



HEAVY-DUTY flexible coupling on Diesel output shaft. This type of coupling has interlocking steel jaws.

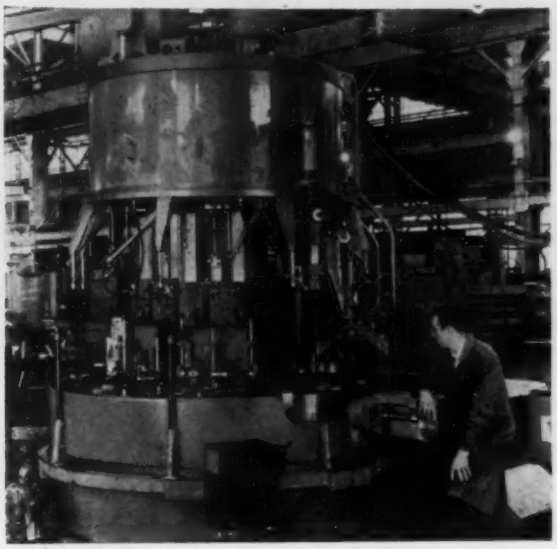
This coupling is provided in both single and double types. The double type incorporates two intermediate discs, usually separated by a cylindrical spool. There are also cases where a double-type flexible coupling is made up of a long shaft having coupling flanges on its ends. These are usually referred to as floating-shaft couplings. The advantage of a double type of flexible coupling is that it will accommodate parallel misalignment to far greater degree than other types.

Parallel misalignment is more serious than angular misalignment. Where a metal-disc coupling is being used, any misalignment causes a slight displacement of the center member, which is permitted by springing or bending of the flexible-disc ring. This misalignment may extend to a maximum of 1°. Anything beyond this is liable to overstress the metal, even though it is a specially-compounded alloy with extremely high fatigue resistance.

One great advantage of this type of coupling, where it can be used, is that there is no spring action involved. It drives like a solid coupling while having sufficient flexibility to take care of misalignment. There are no wearing parts in such a coupling, and no oil is needed. It cannot get out of balance. This is a highly important factor where very high speeds are involved.

Where the floating-shaft type of coupling is used, a greater amount of misalignment can be accommodated. The farther apart the coupling halves are, the more misalignment can be tolerated.

Many special couplings are produced, following this basic design. These include special marine thrust couplings, which separate propeller shafting from the engine or reduction gear output shaft. Units of this kind also have facilities for taking care of propeller thrust in either direction.



GEAR type of flexible coupling as used on a machine tool. Some couplings of this type can be adapted for high speeds.

Large floating-shaft couplings are often supplied for heavy-duty motor and engine drives. Some of these have had lengths as great as 20 ft. Because there is a complete absence of backlash on this design of coupling, it is well adapted for use with pulsating loads such as on vacuum pumps and compressors.

There is a flexible coupling designed so that either half may be independently rotated. When used in connection with an engine, such an arrangement will allow adjustment of timing of the engine.

Flexible couplings for very small shafts are usually much simpler than those for larger shafts. Couplings used on fractional horsepower drives sometimes have a central rubber member permanently bonded to two steel hubs.

One large flexible coupling makes use of rubber balls. The coupling consists of a flange containing six balls of composition rubber, and a retaining cover with six projections. These projections serve to hold the balls in place. The tough resilient balls transmit all the power, and

absorb shock and vibration without carrying any end thrust.

It should be remembered that the flexible coupling is not to be considered as a universal joint. Wherever and whenever any substantial amount of misalignment is detected, it should be corrected.

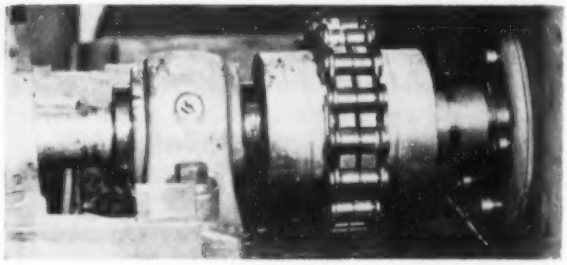
There are flexible couplings which make use of a combination of pins and rubber bushings to provide the necessary degree of flexibility. In such cases, the rubber bushings are often lined with metal where they engage the pins or fingers. Metal linings used for such bushings are usually made of self-lubricating bronze.

Special block transmits power

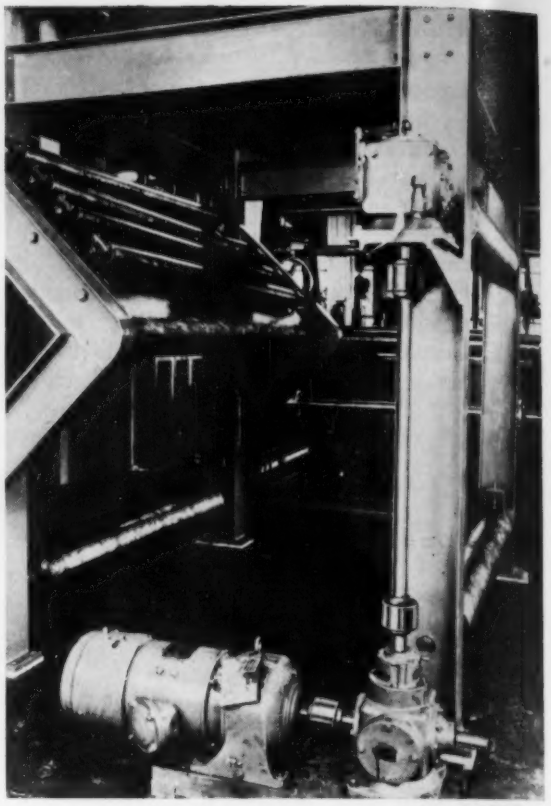
Flexible couplings are sometimes made with a central square block. The two hub-type members in this case are provided with two jaws each, so that the four jaws are located around the four sides of the square block, which acts as the central driving member. Couplings of this type have the advantage that when they are operated under parallel misalignment, the block is free to slide. A certain amount of clearance must be provided between block and jaws, to take care of any angular misalignment which may be present.

Flexible couplings are made with either roller or silent chain. A coupling of this kind consists of two hubbed sprockets. A piece of roller chain or silent chain, is placed around the two sprockets, the chain being wide enough to cover the full width of both sprocket faces. Thus, one sprocket drives the other through the medium of the encircling chain. Where a chain type of flexible coupling is employed, it is necessary to encase the coupling in a cover and to keep oil in the coupling.

Related in general principle is a type of flexible coupling which makes use of two gears on the ends of the two shafts to be connected. The gears are confined in an outer shell-type member, wide enough to cover the both gears and having internal teeth which mesh with the gears. Thus, the drive is from one gear to the covering member to the other gear. On this type of coupling it also is necessary to provide means for retaining lubricating oil.



CHAIN transmits power between the two members of this flexible coupling. Oil guard has been removed for photo.



GEAR type flexible couplings used on paper machine tensioning device. Vertical coupling is floating shaft type, with coupling's two elements separated by a shaft.

Couplings of this kind are very good in compensating for both angular and parallel misalignment. It is usually necessary to provide clearance between the teeth to permit movement of the encircling member, so it can act as an actual flxible element. However, couplings of this type are now made with crowned teeth. These are free to align themselves in the general manner of a ball and socket joint, so that no excessive amount of play need be present.

Some of the couplings of this type are adapted for use on high speeds, as each half is in perfect balance and is concentrically supported on its own shaft. They may be used on reversing service without noise or vibration, if desired.

Some of these couplings actually have more strength than the shafts which they connect. This is significant. It means that where a shaft size is correct, load need never be limited by a coupling. There are few engineers and operating mechanics who do not realize there are unavoidable errors in alignment of machinery, as well as cases in which free lateral float to one of two units connected must be permitted. A suitable type of flexible coupling will provide insurance against abuse from this factor.

ENGLISH USE BORON IN NORMALIZED AND DRAWN HEAVY SECTIONS

By W. E. Bardgett
Research Manager
United Steel Cos., Ltd.

English practice uses boron to strengthen heavy alloy steel sections in the normalized and drawn condition. This is contrary to the United States practice which aims first at conservation of critical alloys. In work undertaken at United Steel Cos., Ltd., low-carbon, low alloy steels with varying amounts of boron in the presence of molybdenum have improved ultimate tensile stress and yield stress.

The addition of boron to low-alloy steels has generally been made to obtain equivalent properties in lower alloy steels when these are hardened and tempered. In studies made at United Steel Cos., Ltd., boron has been added to obtain high ultimate tensile stress and yield stress values in steels in the as-rolled or normalized condition. A low-carbon content was used throughout to provide easy weldability.

Improvement in properties of existing steels by addition of boron—rather than replacement of alloying elements by boron—may ultimately lead to economic advantages by reductions in amount of steel used and overall costs.

Attention was first directed to the possible advantages of boron in improving mechanical properties by the results of tests on a low-carbon 0.50 pct Mo steel. Yield strength was doubled and tensile strength increased 30 pct with an addition of 0.003 pct B. A series of low-carbon steels containing boron and variable molybdenum content was studied.

Results of tests on two such series, containing respectively 0.05 pct and 0.14 pct C, are given in Table I. The steels were made in an 18 lb high-frequency furnace, forged to ⅝ in. diam bar and air cooled.

In the lower carbon series, the effect of boron on the mechanical properties, in the presence of 0.15 pct Mo, was negligible. Tensile strength and yield strength increased progressively with increase in Mo to 0.35 pct. At 0.44 pct Mo ultimate tensile stress had increased 48 pct and yield stress more than doubled.

Further increase in molybdenum content had no significant effect. Elongation decreased corresponding to increase in tensile strength. Reduction in area figures decreased only slightly with increase in tensile strength. The high yield stress of the steels containing over 0.35 pct Mo and with only 0.04 to 0.05 pct C is noteworthy.

The second series, steels with 0.14 pct C had similar characteristics. Remarkably good properties were obtained when the steel contained more than 0.30 pct Mo.

The somewhat critical nature of the molybdenum content in the presence of boron for these two series is shown in Fig. 1. While some advantage in the boron addition was obtained with 0.25 pct Mo, it was only slight compared with the advantage gained with more than about 0.35 pct Mo.

In a series of 0.5 pct Mo-B steels, increasing

TABLE I

ANALYSES, HEAT-TREATMENT, AND MECHANICAL PROPERTIES OF EXPERIMENTAL STEELS

Steel	Analysis, pct						Heat Treatment (Air Cooled)	Mechanical Properties				
	C	Mn	Si	Mo	B	Other Elements		Ultimate Tensile Stress, tons/sq in.	Yield Stress, tons/sq in.	Elongation on 2 in., pct	Reduction of Area, pct	Izod, ft lb
SERIES I—0.05 pct C-Mo-B Steel: Variable Molybdenum												
1	0.05	0.43	0.25	0.15	0.003	.....	940°C	24.5	15.2	44.0	78.0	93
2	0.05	0.41	0.22	0.25	0.004	.....	940°C	27.6	21.3	44.0	79.0	98
3	0.04	0.41	0.21	0.35	0.0033	.....	940°C	33.8	29.1	43.4	73.0	98
4	0.045	0.43	0.24	0.44	0.0035	.....	940°C	36.2	31.9	31.4	73.0	95
5	0.04	0.41	0.23	0.51	0.0025	.....	940°C	36.3	31.6	28.0	70.9	95
6	0.05	0.43	0.23	0.62	0.0034	.....	940°C	37.0	32.2	28.6	70.9	100
SERIES II—0.14 pct C-Mo-B Steel: Variable Molybdenum												
7	0.12	0.43	0.21	0.12	0.003	.....	920°C	27.6	19.8	39.5	70.0	73
8	0.13	0.43	0.23	0.22	0.002	.....	920°C	31.6	21.2	33.0	70.0	90
9	0.13	0.45	0.23	0.31	0.004	.....	920°C	37.4	30.6	27.5	66.0	65
10	0.15	0.46	0.21	0.42	0.003	.....	920°C	40.4	33.8	25.0	63.6	82
11	0.14	0.45	0.26	0.54	0.003	.....	920°C	42.1	35.9	25.0	63.6	80
12	0.14	0.47	0.23	0.66	0.0025	.....	920°C	43.4	37.4	24.0	62.6	55
SERIES IV—Ni-Mo Steel, with and without Boron: Variable Molybdenum												
18	0.15	0.55	0.28	0.12	.....	Ni 2.11	880°C	35.8	24.2	35.0	65.3	84
19	0.15	0.59	0.28	0.21	.....	Ni 2.07	880°C	37.0	28.5	34.0	62.0	72
20	0.14	0.55	0.27	0.30	.....	Ni 2.06	880°C	38.8	29.9	32.0	62.2	76
21	0.14	0.55	0.30	0.14	0.0025	Ni 2.14	880°C	40.9	31.3	30.6	63.9	80
22	0.15	0.57	0.30	0.21	0.0026	Ni 2.08	880°C	45.6	39.3	27.0	60.5	47
23	0.14	0.55	0.30	0.31	0.0026	Ni 2.12	880°C	45.3	38.1	26.0	58.7	40

English use boron (continued)

the carbon content increased ultimate tensile stress and yield stress. Poor notch impact toughness was obtained, however, when carbon content reached 0.18 pct.

The effect of increasing boron in the presence of 0.5 pct Mo was found to be beneficial up to about 0.007 pct. Beyond this figure ultimate tensile stress and yield stress decreased to low values.

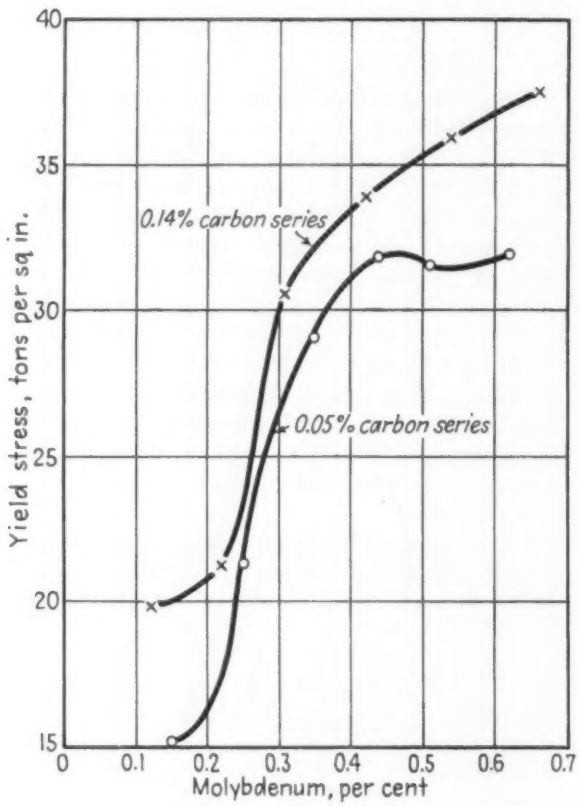


FIG. 1—Effect on yield stress of increasing molybdenum content in steels containing 0.003 pct B.

Boron did not improve low-carbon steels containing respectively 0.6 pct Ni, up to 1.5 pct Cr, 0.07 pct and 0.1 pct V.

Since boron raises yield stress and ultimate tensile stress in the presence of molybdenum but not in the presence of chromium, nickel or vanadium, some interaction of molybdenum and boron is indicated. The maximum effect of boron is obtained only above a certain minimum molybdenum content.

Tests on a 1.0 pct Mn-Mo-B steel of variable molybdenum content showed a marked change when molybdenum was increased from 0.11 to 0.21 pct. Ultimate tensile stress increased from 36.4 to 45.9 tons per sq in. and yield stress from 22.8 to 33.2 tons per sq in. With further increase in molybdenum to 0.51 pct ultimate tensile stress and yield stress increased slightly. The higher manganese steels of this series, compared with those in Series II, showed much lower notch-impact value for equivalent tensile strength.

Effect of boron with moly

The 2.0 pct Ni steels of varying molybdenum content, with and without boron, showed (Table I) that in the absence of boron the effect on ultimate tensile stress and yield stress of increasing molybdenum content was uniformly progressive. In the presence of boron there appeared to be a critical amount of molybdenum above which there was a rapid increase in yield stress.

The effect of boron on ultimate tensile stress and yield stress at all three levels of molybdenum content was appreciable and generally equal. Comparing Steel No. 9 with Steel No. 20, the boron present in Steel No. 9 was equivalent to 2.0 pct Ni.

Comparison of the Cr-Mo steels with similar

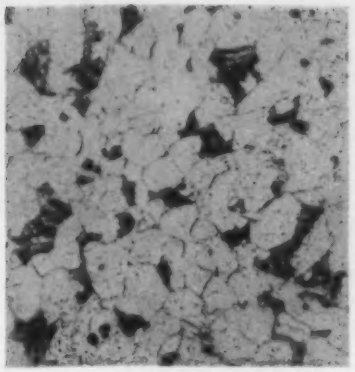


FIG. 2—Plain molybdenum steel. Air cooled from 930°-940°C in the form of ⅝ in. diam bar. Nital, 2 pct. 300X.

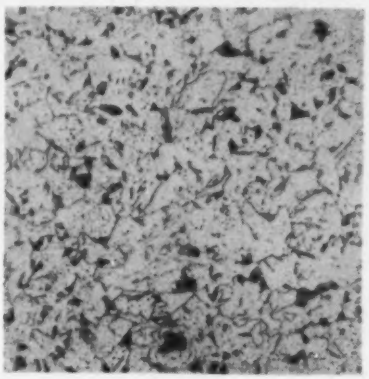


FIG. 3—Molybdenum-boron steel. Air cooled from 930°-940°C in the form of ⅝ in. diam bar. Nital, 2 pct. 300X.

steels containing boron showed that in the presence of up to about 0.2 pct Mo, boron had little effect on the properties.

When molybdenum was increased to about 0.3 pct, the effect of boron increased markedly the ultimate tensile stress and yield stress. The effect became more pronounced when molybdenum content reached 0.4 pct. The increase in tensile strength, due to the boron addition, was accompanied by a corresponding lowering of elongation values. Reduction in area values showed a substantial increase. A marked drop in impact values with increase in tensile strength was noted.

The best low carbon steel from the point of high ultimate tensile stress and yield stress was that containing over 0.35 pct Mo with about 0.003 pct B (Fortiweld—U. S. Patent No. 2,513,395).

The effect on the structure of adding boron to this plain molybdenum steel is shown by comparison of Figs. 2 and 3. The plain molybdenum steel had a larger grain size and structure consisting of sorbitic pearlite areas in ferrite with a small amount of martensite.

The pearlite and martensite areas of the boron-containing steel were much smaller and unevenly distributed. Boron showed a marked influence in retarding. With faster cooling

TABLE II

TYPICAL MECHANICAL PROPERTIES

	2-ton HF Cast	25-ton Basic Open Hearth Cast					
Analyses, pct:							
Carbon	0.14	0.13					
Manganese	0.52	0.52					
Silicon	0.32	0.295					
Sulphur	0.029	0.035					
Phosphorus	0.012	0.029					
Molybdenum	0.44	0.38					
Boron, Sol.	0.0032	0.0032					
Insol.	Nil	0.0001					
		Channel		Tested Length Direction			
Form	Bar 2 in.	10 x 3½ in.	3 x 1½ in.	Plate—½ in.		Plate—1½ in.	
Heat Treatment	960°C Air cooled	As rolled	As rolled	As rolled	930°C Air cooled	As rolled	960°C Air cooled
Mechanical Properties:							
Ultimate tensile stress, tons/sq in.	40.4	44.8	43.5	42.8	37.8	43.5	35.7
Yield stress, tons/sq in.	33.0	.....	.....	32.4	28.5	32.5	27.8
Proof stress, tons/sq in.:							
0.25 pct ext.	29.9	.....	.....	.....	.....	.....	.....
0.20 pct ext.	29.1	.....	31.8	.....	.....	.....	.....
0.10 pct ext.	27.5	28.3	28.4	.....	.....	.....	.....
0.05 pct ext.	27.0	25.9	26.6	.....	.....	.....	.....
0.02 pct ext.	26.6	23.4	24.7	.....	.....	.....	.....
Limit of Proportionality	22.7	17.8	17.7	.....	.....	.....	.....
Elong. on 2 in. pct	27.3	27.5	.....	33.2	29.8	23.3	43.0
Reduction of Area, pct	64.5	61.6	58.8	55.0	58.8	28.3	61.8
Izod Impact, ft lb	73	14	38 (equivalent)	37	94	4	38

rates transformation to ferrite was lowered from about 820°/690°C to about 630°C.

The rate of cooling through the range 900 to 870, in degrees C per min, below which transformation took place wholly or partially at the higher temperature (limiting rate of cooling), was determined for a series of steels of varying molybdenum content. This was related to bars of various diameters and plates of various thicknesses to show the size in which high ultimate tensile stress and proof stress would be obtained.

To obtain suitable mechanical properties in bars of about 4 in. diam a minimum molybdenum content of 0.4 pct is necessary. The minimum molybdenum content for good mechanical properties, in a wide range of sizes, was fairly critical at about 0.35 pct.

Lower limit of effective boron

It is well known that boron has no effect on mechanical properties unless the steel is thoroughly deoxidized prior to the addition of boron. Since boron may combine with oxygen and nitrogen, it is of interest to consider the lower limit of effective boron.

A series of steels were made with varying additions of ferroboron, Silcaz and ferroboron with ferrotitanium. Prior aluminum additions, in varying amounts, were also made. Determinations of soluble and insoluble boron were made. The limiting section for high ultimate tensile stress and yield stress on the basis of limiting rate of cooling was also found. These results are shown in Fig. 4. The minimum soluble boron

for good mechanical properties is critical at a value of about 0.0014 pct.

The plain molybdenum-boron steel has been made in the high frequency, electric arc and basic openhearth furnaces. Perhaps the most noteworthy feature from the steelmaking view is the uniformity in boron distribution. In a 25-ton cast, boron varied from 0.0031 to 0.0035 pct soluble in 20 determinations on plates.

Typical mechanical properties obtained in a 2 in. diam bar made from a 2-ton high frequency cast and on plates and sections from a 25-ton cast are shown in Table II.

Mechanical properties of the 2-in. diam bar at the mid-radial position were good in every respect. High proof stress values, good ductility and toughness were obtained without tempering. The properties of the as-rolled channel sections were similar to those of the normalized bar apart from the lower limit of proportionality and impact values.

The ½ in. plate showed good properties in both the as-rolled and normalized conditions. The 1½-in. plate, however, showed poor impact properties and crystalline fractures in the as-rolled condition but substantial improvement was effected by normalizing.

Seamless, welded tubes made

Material from the 2-ton hf cast was made into both seamless and welded tubes. The seamless tubes were produced from a 4¾ in. sq billet on a push bench type mill. Welded tubes were produced from normalized strip 3 3/16 in. x 0.0625 in. Properties obtained without subsequent heat treatment are shown in Table III. Normalizing in effect lowered the proof stress values owing to the presence of considerable amounts of martensite.

Retarded cooling would no doubt overcome this effect since the thicker tubes showed better proof stress. Tests on tubes of 2¼ in. OD and 0.132-in. and 0.211-in. wall thickness showed only slight changes in mechanical properties on normalizing. The yield stress figures of the 0.211 in. wall tube were 33.8 and 32.8 tons per sq in. before and after normalizing. The corresponding figures for the 0.132 in. wall tube were 35.5 and 34.3 tons per sq in.

Fatigue tests were conducted on plain and notched specimens taken from a 10 in. x 3½ in. x ½ in. channel of Mo-B steel in the as-rolled condition, and from 1-in. diam bar of 0.35 pct C steel in the normalized condition.

TABLE III
PROPERTIES OF MOLY-BORON STEEL TUBING

	2 in. OD by ⅛ in. Wall Seamless	⅞ in. OD by 1/16 in. Wall Welded
Ultimate tensile stress, tons/sq in.	50.5	40.0
Proof stress, tons/sq in.:		
0.20 pct ext.	36.4	36.3
0.10 pct ext.	34.8	31.1
0.05 pct ext.	33.0	24.7
0.02 pct ext.	29.9	19.2
Elong. on 2 in., pct	22.0	16.0
Bend Test	180°, no cracks	180°, no cracks
Flattening Test	No cracks	No cracks

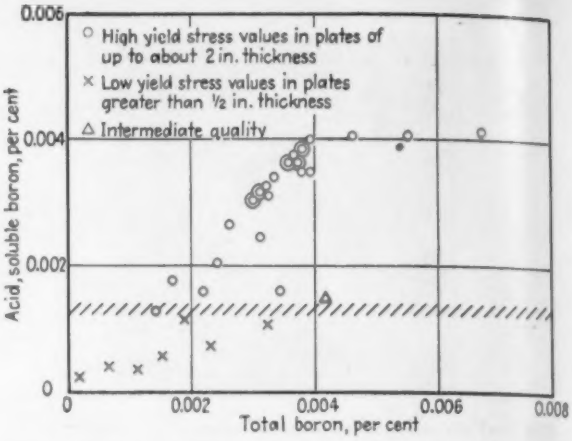


Fig. 4—Relation between mechanical properties as measured by yield stress and acid-soluble and insoluble boron.

The plain specimens were 0.30 in. diam and the notched specimens 0.335 in. diam at the top of the notch and 0.295 in. at the bottom corresponding to a ⅜ in. BSW form.

The Mo-B steel showed marked superiority over the plain 0.35 pct C steel both in the plain and notched specimens. The lowering of the fatigue strength due to the stress raiser was more marked in the plain carbon steel.

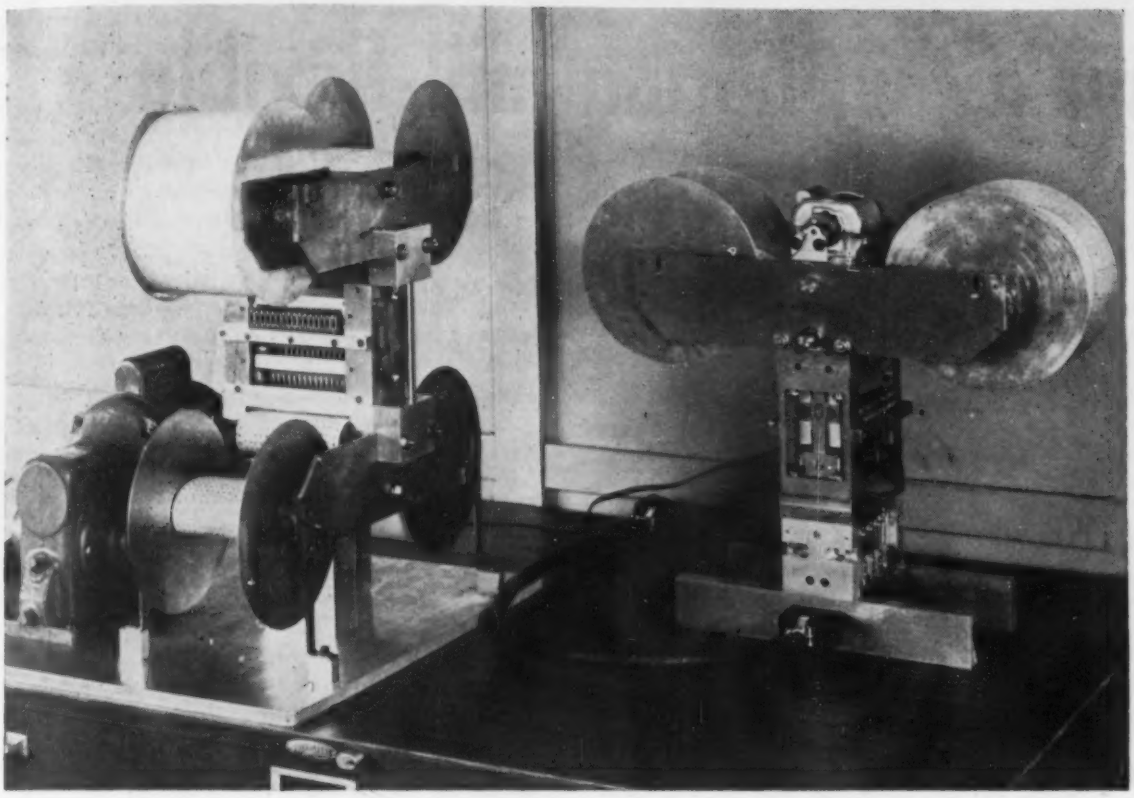
Creep properties are important where a high tensile weldable steel has applications in high temperature service. Aluminum has a harmful effect on the creep resistance of plain low carbon steel. It was thought the Mo-B steel, to which substantial amounts of aluminum are added to effect complete deoxidation, would have low creep properties. This has not proved to be the case. Comparisons with a similar steel free from boron and to which no aluminum was added, indicate the Mo-B steel was generally superior to the plain 0.50 pct Mo steel.

Corrosion tests were carried out in an industrial atmosphere for periods up to 12 months on 10 gage samples having a surface area of 16 sq in. The Mo-B steel was tested alongside a similar steel without boron, mild steel, Mu-Mo steel, and a copper-bearing steel.

The 1.5 pct Mn steel proved slightly superior to the mild steel. The 0.33 pct Cu steel and the 0.5 pct Mo steel showed higher resistance. Of these the Mo steel was the best, implying that 0.5 pct Mo has a greater beneficial effect than 0.33 pct Cu. It should be noted, however, that the residual copper of 0.13 pct would contribute some atmospheric corrosion resistance.

The best steel of the series was the Mo-B steel. How much of the improvement was due to boron alone is not known as the Silcaz addition contains other alloys.

Robot controls machine tools



TAPE MECHANISM feeds orders to machine tool through control device. At left is device for punching information on tape. At right is sensor which reads tape and converts the information into electrical signals.

A robot machinist has been developed which will operate a machine tool from an engineer's office or other distant point, announced by Daco Machine and Tool Company of Brooklyn, N. Y. According to Daco engineers, the day of the automatic factory has been brought closer by the robot machinist. It is particularly valuable for mass production plants having long repetitive runs of metal-cutting operations.

The parts that make up the Daco-built device are a paper-tape perforator, and a sensor that translates the tape message into electrical impulses that actuate selsyn motors which, like the operator's hands, tell the machine what to do. Perforations in the tape represent essential dimensions shown on the blueprint for the part to be machined. When the tape travels through the sensor, electrical contacts are made and broken through the holes to complete and break electrical circuits. This produces varying voltages in the sensor that accurately control movement of the cutting tool and work piece in the machine.

Machining accuracy is in no way influenced by the robot. Deviations in the dimensions of the machined part, if any, are the fault of the tool.

About the only manpower needed around the machine tool is for loading and unloading the work. As is usually done, dimensions will be checked periodically to see that parts are within tolerance limits, and to determine when worn tools need to be replaced.

Once a production run is completed on a given machine, the robot can be attached to another to do a completely different job.

Brains of the Daco-built device are in the tape. It can be punched out by a draftsman who makes computations from a blueprint. In effect, he places the part drawing over a grid-like graph paper. Holes in the tape represent points and surfaces on the part. A plant operating such robots would probably keep a file of master tapes representing various arcs, flat surfaces and fillets. To set up a tape for machining a part, a series of master tapes of the right combination could be fastened together.

A somewhat similar device was recently announced by the Arma Corp. (see THE IRON AGE, Aug. 3, 1950, p. 73).

SPECIAL CONTROLS make big boring mill flexible

by V. H. Simson
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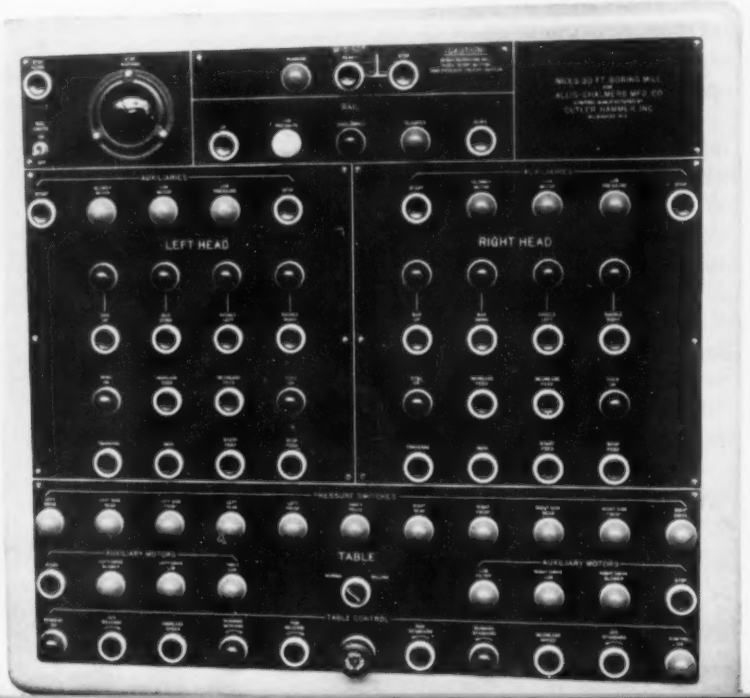
Cutler-Hammer, Inc.
Milwaukee

This new Niles 30-ft boring mill is no unwieldy elephant. Its control system makes it flexible and versatile. Table speed range is 6000:1, to handle milling as well as boring. Heads have feed range of 1500:1. Heads may operate independently, or be locked electrically to work two tools on the same cut.

Although some larger machines have been built, boring mills the size of the 30-ft machine recently installed for Allis-Chalmers Manufacturing Co., Milwaukee, are far from common. And this particular mill is unique among equipment in its size class because of the versatility and flexibility which its interesting control system gives it.

The features of this machine result from engineering and manufacturing by Allis-Chalmers itself, as well as by Baldwin-Lima-Hamilton which built the machine, and Cutler-Hammer, which built the controls. The major requirements were: A high top speed for the rotating table; a wide speed range for both table and feed; adequate motor power for possible future developments in tools and metals; a maximum of flexibility in function and in controls; and a high degree of safety.

ONE OF FOUR panels from which machine may be controlled. This is the control panel of the right console cabinet.



The top table speed is 12 rpm. The speed at the periphery of the 25-ft table is thus over 10 mph. It is equivalent to the surface speed of a 1-in. shaft turning at about 3600 rpm.

Although the high speed is an unusual feature, the lowest obtainable speed is even more outstanding. By means of gear changes and adjustable motor voltage, the table may be operated at 0.002 rpm. Thus the total speed range is 6000:1. This slow speed is intended for milling operations when the table provides the feed motion.

The feed mechanism, controlled by an electronic rectifier, has a range of 1500:1. Its range is from 0.004 to 6 ipm. This is in addition to the rapid traverse speed of 72 ipm.

The table is driven by two 150-hp dc motors. Each head has a 20-hp dc motor for bar and saddle feeds, and there is a 25-hp motor for the milling attachment. In general, this is much more power than is required. However, boring mills last for a long time. The 40-ft mill in Allis-Chalmers' shop was installed in 1928. Over a period of years new machining developments may raise power demands more than can be foreseen now. So this machine is overpowered for present shop needs.

Control flexibility is given the machine by the use of four pushbutton stations, from any of which the machine may be operated. There is also a pendant station, for table control alone. Two console pushbutton stations are floor mounted near the table, to the right and left sides of the machine. The other two stations are flush mounted, one on each cutting head saddle. For functional flexibility, the feed motion of each head can operate independently. However when desired, the two feed motors can be electrically locked in synchronism. They then operate as though a single motor were mechanically driving both feeds.

Safety features include special attention to pushbutton marking, so that no button can be accidentally confused with more than one marking. Safety switches are located at easily accessible places in the pit, capable of stopping motion of the machine. For major servicing, the ready button on the right console may be padlocked, which prevents closing of the main circuit breaker on incoming power lines.

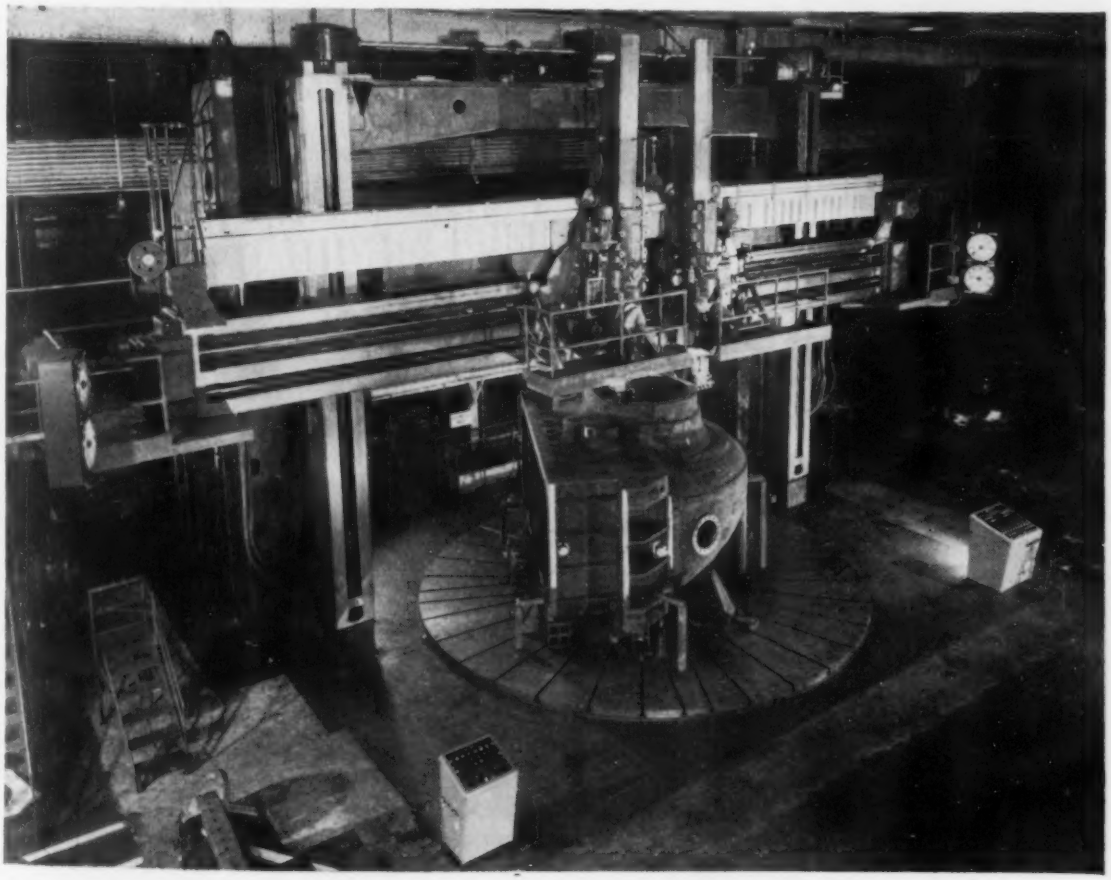
The table is driven by two Allis-Chalmers 150-hp dc motors. In addition, there are 10 auxiliary motors of various types. The wide speed range on the table, a product of the adjustable voltage control and two gear ratios, makes the machine peculiarly adapted to a great variety of jobs. With the milling head operating, the table may become a feed drive, feeding the work slowly into the rotating cutter.

For boring operations, the table may be driven slowly, the tools cutting off large quantities of metal. Or when operating at high speed, fine shaving cuts may be taken, perhaps only at a 1 or 2-ft radius on a piece too large to be mounted in a lathe. Where a fine cut must be used because of the nature of the work, for example a high pressure turbine casing, the high speed is essential to complete the machining as rapidly as possible.

Automatic gear shifting, as developed for this mill, effects all gear changes by operation of four gear-shifter motors. These motors are then disconnected by in-gear limit switches in either direction. The gear-shift motors are automatically energized at the proper time. This occurs when the operator, by holding down the increase or decrease speed button, continues to call for additional speed changes beyond the speed range of the motors for that particular gear.

The left head of the machine includes the saddle, which moves on the rail, and the bar, which moves up and down in the saddle. The bar is the portion of the machine to which cutting tools are fastened.

The left head feed-traverse motor drives either the saddle or the bar depending on whether the saddle or bar clutch is engaged. Both clutches are disengaged when the motor

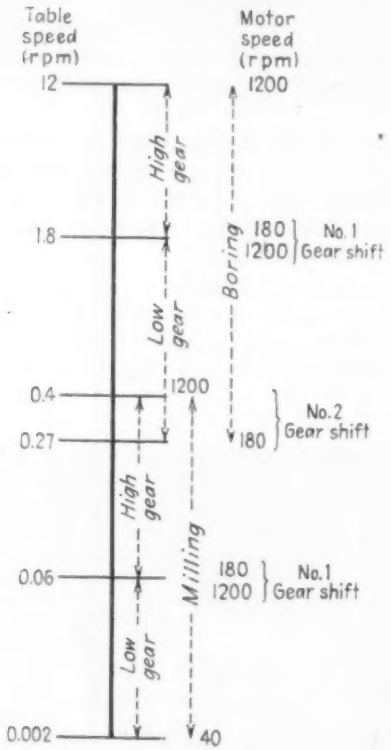


ALLIS-CHALMERS' new 30-ft boring mill in operation.

is stopped. This 20-hp dc motor is powered from ac lines through an electronic rectifier. This control provides essentially a stepless feed rate over the entire range.

The feed range of the tool, 0.004 to 6 ipm, is made possible by the wide speed range of the motor and one automatic gear shift. The power for this gear shift is hydraulic, derived from the machine's lubricating oil system.

The left head motor may be controlled from any of three pushbutton stations: Right Console, Left Console or Left Head. Four buttons are used to preset the direction and select



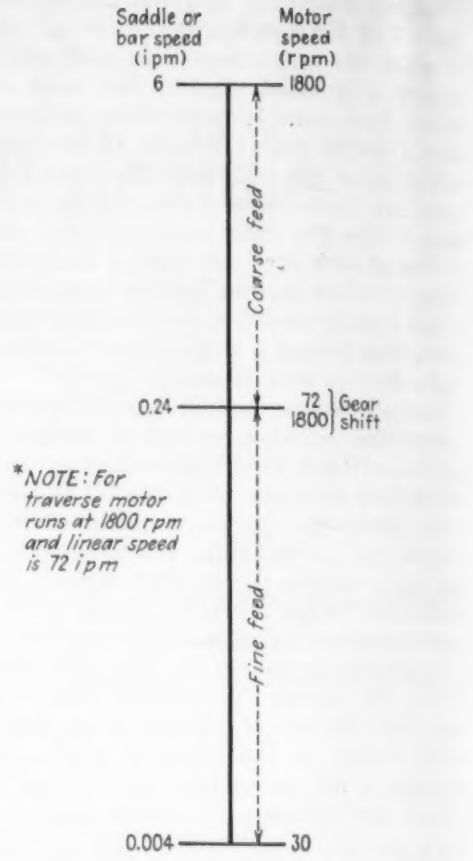
GRAPHIC representation of how gear changes and electric motor speed changes are combined for table speed range.

saddle or bar. These are marked Bar Up, Bar Down, Saddle Left, and Saddle Right. One of three other buttons, Start Feed, Inch, or Traverse, is used to actually start the feed motor and operate the bar or saddle clutch.

The right head is a mirror image of the left head in all respects. Pushbuttons for operator control are located on the Right and Left Consoles and the Right Head.

While the left and right feed systems are entirely separate, they may be made to run together and operate at exactly the same speed. The operator simply turns a selector switch on the right head pushbutton station. This applies power to Allis-Chalmers position transmitters and receivers, one for each feed motor.

The transmitters, mounted on the machine



GRAPHIC representation of how one gear change and motor speed changes are combined to give wide feed range.

and mechanically driven by the feed motors, are electrically connected to receivers mounted on the control panel. These receivers then turn at exactly the same speed as the transmitters. The receiver shafts are connected to a mechanical differential whose output, representing the difference of the two motor revolutions, drives a potentiometer rheostat. The rheostat is connected in the electronic control circuit of the left feed motor in such a way as to correct its speed automatically and continuously, to that of the right feed motor.

The purpose of synchronizing is to allow the operator to apply two tools to share a cut which is beyond the strength of a single tool. With the feed motors operating independently, any tendency of one motor to run faster would soon result in its tool hogging the whole cut. The synchronizer automatically corrects for this tendency. If the tools are properly set initially, they will continue to maintain the same relative position on the work.

The advantages of this system are that a complicated and expensive mechanical system for connecting both feed drives together is not needed, any combination of bar and saddle motions may be synchronized, and the transfer of synchronization on or off requires only the flick of a selector switch.

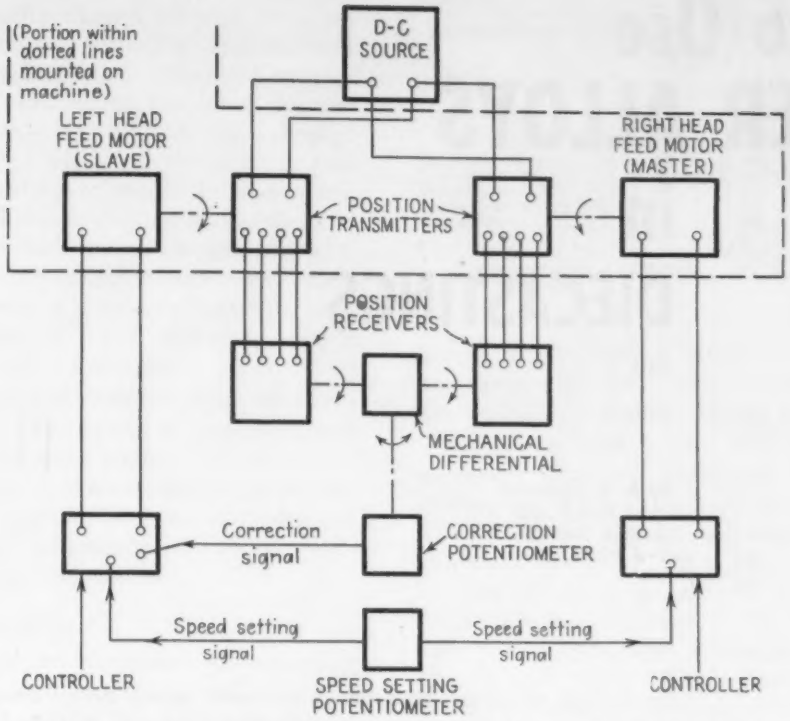


DIAGRAM of electrical system which locks feed motors in synchronization without mechanical connection. Mill uses total of 45 motors.

The rail is raised and lowered on the machine by a 30-hp reversing motor. In addition, there is a lubricating motor and four clamping motors. The operator positions the rail by the use of two buttons: Rail Up and Rail Down. Automatic unclamping precedes energization of the rail motor, and automatic clamping follows release of the button.

A special multi-speed milling head may be fastened on the rail to the inside of the right saddle. It then moves left and right with the saddle, as driven by the right head feed motor. Electrical power and control connections to the milling head are made through flexible cables to plugs and receptacles.

The milling cutter is powered by a 25-hp 2-speed, constant-horsepower motor, which is a part of the milling head. The two motor speeds, together with several gear changes available within the milling head, provide a wide range of cutter speeds.

For milling work, the table may be still and the milling head moved left and right by the right saddle. Or the saddle may be clamped and the work fed into the rotating spindle by the table. In still another arrangement, the saddle and the table may operate together.

In addition to the milling feed motions provided by the saddle and table, the milling head itself also has a manually controlled quill feeding system for up and down positioning of the cutter.

The 30-foot mill uses a total of 45 motors, all made by Allis-Chalmers. A massive trolley system used to transfer power and control to the saddles includes over 100 movable collectors. Four large meters indicate table speed and load, and feed rates. Guiding this whole machine in its every function is the controller, which, even with panels mounted back-to-back, is 20 ft long. It contains more than 500 control devices, mechanical, electrical, and electronic, and 12,000 feet of wire. About 9 miles of wire were used for the whole installation.

Portable ray detector safeguards equipment, personnel

A portable radiation probe which measures alpha, beta, gamma and thermal neutron radiations has been developed for use in factories and hospitals where contamination of personnel, clothing and equipment can be a serious problem.

The probe, with interchangeable heads for detecting different radiations, incorporates the advantages of scintillation counting. Low background alpha counting is possible and alpha particles can be counted in the presence of high beta-gamma background.

The device accommodates large phosphor samples. All components of the probe are included in one small, tube-like assembly. The unit operates with up to 50 ft of cable.

How to Use COPPER ALLOYS in DIECASTINGS

Part II

By L. F. Spencer
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Diecastings of copper-base alloys are useful where design complexity is combined with high strength requirements. The high casting temperatures of these alloys present problems in die material selection which have not entirely been solved. Special casting and die design considerations apply when diecasting copper-base alloys.

Pressure diecastings made from copper-base alloys are not as extensively used as those in aluminum and zinc alloy. But they can be used to advantage where complexity of design is combined with high strength requirements. While pressure diecastings are less dense in grain structure than hot pressed or forged parts, they are adaptable to a wider range of design. Intricate coring does not present any special difficulty nor do heavy sections with thin webs, thin sections with reinforcing ribs, or bosses.

The copper-zinc alloys are extensively used as pressure diecasting material. Their casting range is in the vicinity of 1700°F. This high casting temperature presents many problems that still have not been entirely solved, especially as to the choice and life span of die material. Nevertheless, brass diecasting procedures are in commercial operation. The strength of the compositions often approaches 100,000 psi, equivalent to the strength of some of the heat treated alloy steels.

The basic compositions usually employed as diecast material are listed in Table I. Alloys 1 and 2 are standard Anaconda alloys. Alloys A and B are covered by ASTM specifications B176-49T. Alloy A is a general purpose alloy of low cost with wide limits as to impurities. Alloy B is of higher purity and is capable of excellent castability and mechanical properties in the as-diecast condition. Alloy 2 is harder and has better physical properties than alloy B and finds use where resistance to wear is required.

The mechanical properties of both alloys A and B as indicated in Table II are usually minimum values. Reports from three laboratories concerning diecast test bars of these alloys, show an average tensile strength of more than 60,000 psi for alloy A and more than 80,000 psi for alloy B. The average yield strength reported was more than 37,000 psi for alloy A and more than 50,000 psi for alloy B. The average Charpy impact values were 20 ft-lb for alloy A and 30 ft-lb for alloy B.

Alloy 2 is used extensively where high strength, hardness and resistance to wear and corrosion is desired. Diecastings of this composition outwear other hard materials in a number of applications, and this alloy has often replaced mild steel.

Such copper alloys as aluminum bronze, tin bronze, and other high copper alloys can be diecast readily. However their casting temperatures are usually too high to be economically formed by this method because of their effect on die materials.

Those alloys containing appreciable amounts of lead such as alloy 1 and alloy A have improved machinability. However, the addition of this element will result in formation of gray spots of metallic lead on the surface of the diecasting due to the tendency of this element to segregate. Lead will also contribute to hot-shortness or possible breakage in diecasting, contributes to the oxide coating of the die, and may form in tiny globules in the grain boundaries causing intergranular weaknesses. Intergranular weakness is also attributed to such elements as bismuth and antimony which should be kept below 0.005 pct.

Tin, manganese and iron increase the hardness of the alloy. Tin, however, improves both corrosion resistance and surface finish, whereas iron reduces corrosion resistance. Both aluminum and magnesium are deoxidizers, but magnesium should be present in amounts sufficient to react with the oxides.

Silicon adds strength

Aluminum, due to its effect in retarding oxidation and in the prevention of volitalization of zinc at the diecasting temperatures, has an impurity limitation of approximately 0.25 pct maximum. That specified for magnesium is usually 0.01 pct. The superiority of alloy 2 in regard to its mechanical properties is due to the silicon content of the alloy. This element also lowers the melting point of the alloy, increases fluidity, and has a deoxidizing effect on the metal.

Both the vertical and horizontal type of cold chamber machine can be employed in pressure casting brass alloys. Section thicknesses that can be cast will vary; sections as thin as 0.070 in. can be diecast if not over too large an area. Due to the high melting temperatures employed in the diecasting of these alloys, heavy sections of ½ in. or more are not recommended due to the tendency to over-heat the die resulting in substantial loss in die life. The maximum weight of a brass diecast part is usually given at 5 lb.

The inclusion of cast threads in a brass casting design is feasible provided the maximum number of threads per inch on external surfaces is 10 and the die is parted on the thread axis. Diecast threads usually require a chasing machining operation where close fits are desired. Internal threads cannot be cast.

TABLE I

COPPER ALLOYS FOR DIECASTING

Element	Chemical Composition, pct			
	Alloy 1	Alloy 2	Alloy A	Alloy B
Copper	60.00	81.50	57.0 min.	63.0 to 67.0
Silicon	0.15	4.25	0.25 max.	0.75 to 1.25
Lead	1.00		1.50 max.	0.25 max.
Manganese	.....	0.15	0.25 max.	0.15 max.
Tin	1.00	.....	1.50 max.	0.25 max.
Aluminum	0.10	.....	0.25 max.	0.15 max.
Iron	.....	.....	0.25 max.	0.15 max.
Other Elements	.....	.....	0.50 max.	0.50 max.
Zinc	37.75	14.10	30.00 min.	remainder

TABLE II

PROPERTIES OF COPPER BASE DIECASTING ALLOYS

	Alloy 1	Alloy 2	Alloy A	Alloy B
Tensile strength, psi	55,000	85,000	45,000	58,000
Yield strength, psi	35,000**	50,000**	25,000***	30,000***
Elongation, pct in 2 in.	8.0	8.0	10.0	15.0
Charpy impact strength, ft-lb	.....	40	30	40
Brinell hardness	.....	170	120	130

** Yield point at 0.5 pct under stress.
*** At 0.2 pct offset.

Drafts on both cores and side walls are necessary as is the case with the other diecasting materials. However, the specific values will vary; for the brass casting alloys, the minimum draft in inches per inch of length or diameter on cores and side walls is usually 0.020. Choice of proper draft values will not only aid in obtaining maximum die life, but also it will aid in the ejection of the part. Where this draft value is too low, ejection may result in either distortion or marring.

One of the advantages of a diecasting process is the use of intricate coring of holes, slots and recesses. In the casting of holes, the minimum diameter feasible in brass alloys is approximately ⅛ in. For brass diecasting alloys, holes that are smaller than 0.186 in. in diameter need not be cored. Holes that have a diameter from 0.186 to 0.500 in. have a cored depth approximately 1½ to 3 times the diameter. In holes that have a diameter from ½ to 1 in., the cored depth will vary from 3 to 5 times the diameter. Where deeper holes are encountered, it is advisable to core a portion of the depth.

Other design tips recommended

Other die design considerations are also recommended. Small fillets should be used on both inside and outside corners where surfaces join, the only exception being in the parting plane where sharp corners may be employed. Production of teeth, serrations, splines and lettering should be confined to surfaces parallel to the parting line.

Although no die alloy has yet been found that will completely meet the service conditions presented in diecasting of brass, the best material thus far is the hot work tungsten-chromium-vanadium composition having 0.30 pct carbon, 9.0 pct tungsten, 3.0 pct chromium and 0.45 pct vanadium. Usually the life of such a die, heat treated to 50 Rc, is from 10,000 to 50,000 cycles, before replacement is necessary. Life varies with such factors as size weight and wall section of the casting. Another composition within the same hot-work group is that containing 0.30 pct carbon, 1.40 pct chromium, 0.40 pct molybdenum, 4.0 pct tungsten and 5.0 pct cobalt.

STAMPINGS MAKE STRONG,

By Herbert Chase
Consultant
Forest Hills, N. Y.

Production of Ansco camera parts presents difficult stamping problems. Cost must be low, yet accuracy must be high to give light-tightness and dependable operation. Many stampings have unusually small corner radii. Others are unusually deep for single operation stampings. Ribbed corners stiffen stampings.

Many interesting stamping problems are encountered in the production of Ansco cameras. Cameras, even those in the low price ranges, are precision instruments. Yet they must be manufactured at lowest possible cost.

Stampings offer an economical method of producing camera parts, as well as accessories such as film spools and reels. Ansco's plant at Binghamton, N. Y., therefore is a heavy producer of intricate and accurate stampings.

All the stampings shown in Fig. 1 go into the Pioneer camera shown. Production of the case is done in the die shown in Fig. 2, used in a 90-ton Bliss press. This stamping is made from coiled cold rolled steel only 0.020 in. thick, of deep drawing grade. Although bottom and corner radii are only 1/16 in., the case is drawn 2¾ in. deep in a single operation and a draw to a depth of 3¼ in. is made on a similar case. No wrinkles are permitted and tearing seldom results.

In the same stroke that drawing is done, the bottom is embossed for the lens bezel and four dimples are produced. The production rate attained is 10 pieces per min. These stampings are stripped from the punch and fall into a tote box for transfer to the trimming operation in another press. Because of the light gage of steel, the stampings are quite light. They have adequate stiffness for the service they perform, partly because of ribbed corners produced in later embossing of top and bottom panels.

A still lighter gage of coiled steel, 0.016 in., is employed in drawing the major part for an 8-mm movie film magazine. This is a comparatively shallow draw but the bottom radius is only 0.015 in. Drawing is done at the rate of 1000 per hr in a 100-ton Warco press, shown in Fig. 3. At the same time, a hole is pierced in the bottom. In a later operation, the bottom is embossed and the hole is extruded.

Trimming of this magazine is done in a duplicate press equipped with a shimmy die. Hand feeding is required but 500 pieces an hour are trimmed. In this die, the trimming is done by slides that are given motion parallel to the face of the die by cams. Clean square edges result.

Covers for the same magazine have the same contour as the major portion and are similar in most respects except that the draw is much shallower. Close dimensions have to be held since light-tightness of the magazine is essential and is largely dependent upon having a cover that is tight fitting. Radii in corners are so small as to be termed "sharp."

Magazine covers are made in a six-station progressive die, 1000 covers per hr are produced from 0.016 x 4¼ in. coil stock that is hand fed because of occasional sticking in the die. In the first operation, two holes, one of which is extruded subsequently, are pierced. Then an I-shaped separating hole is pierced in the strip so that the stock can draw in at the next station. Return flanges are left around the contour.

In the fourth station, the large hole is extruded and, in the fifth, the second hole is en-

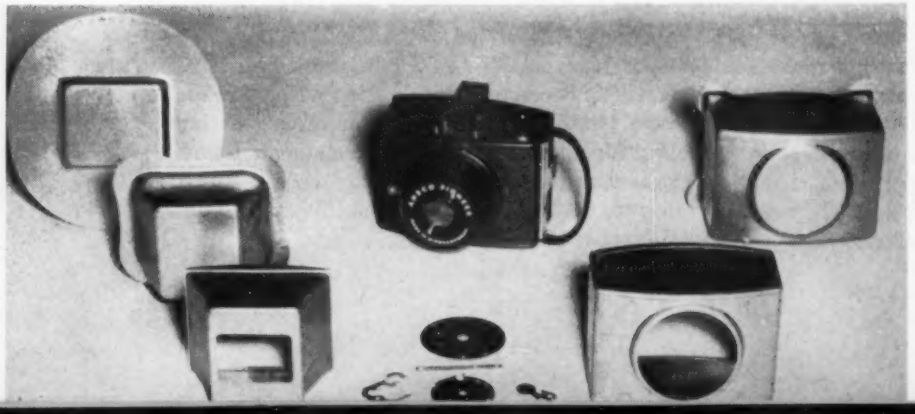

FIG. 1—Typical stampings used in an Ansco camera. Parts are deep-drawn.

ACCURATE CAMERA PARTS

larged and given four notches. Finally, at the sixth station, the return flange is nipped off and the finished piece drops from the die. These steps show in the strip, Fig. 4.

Between operations, the strip is indexed 2 15/16 in., being advanced with the partly completed work pieces attached to ribbons at the edges. Scrap is coiled as is feeds from the press.

Among stampings employed on the Rediflex camera is a finder cover. As this stamping is roughly triangular in side projection and is drawn at one end only, production is effected in a blank and draw die that makes two pieces as one stamping. This balances the draws, one being at each end, and avoids the unbalanced side pressure that would occur if one piece were to be drawn separately. The resulting stamping is subsequently sheared in half to make two covers.

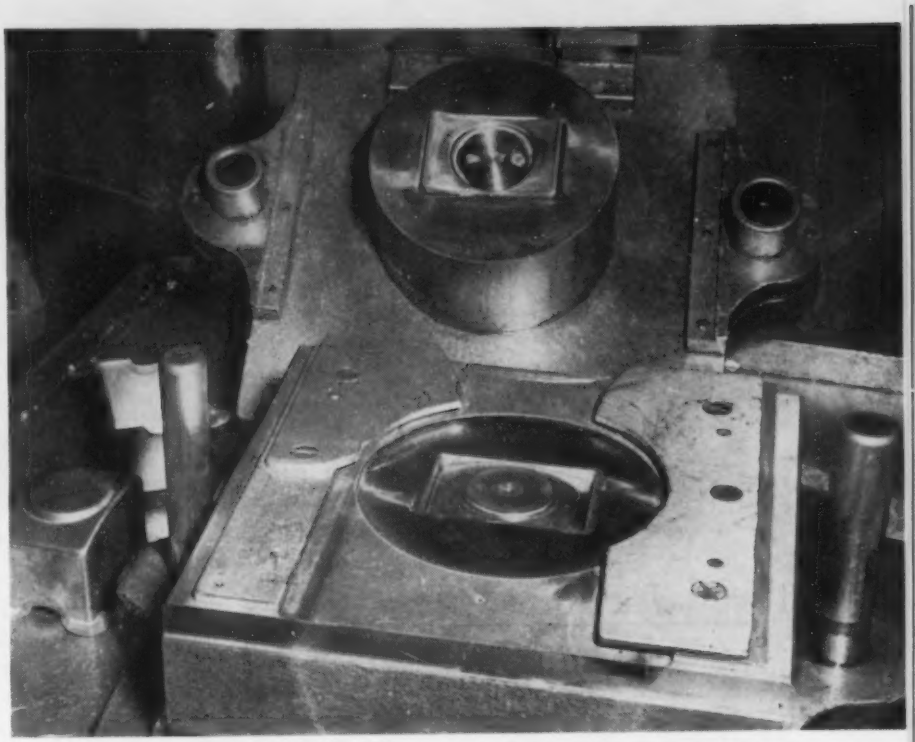

FIG. 2—Draw die used in producing body stamping for Ansco Pioneer camera shown in Fig. 1.

There are two stations in the die, the first having two punches that produce contour at the narrow ends of the developed wings. The strip is indexed 5⅞ in. to bring it under a punch that blanks the remaining contour and, with further motion, forms the wings back at each side and draws the two ends. Most of the portion between the wings is serrated by pads in the die, this being done largely for appearance purposes. Setup of this die is in a No. 21 Bliss press. The production rate is about 600 per hr, and, as each stamping makes two finder covers when cut in two, the number of covers per hour is double the stamping rate.

Production of one camera involves a part termed a camlock. This is noteworthy partly because of the close dimensions that have to be held. Its shape is unusual, as it involves a circular portion having six tabs that are bent upward, each being given a return flange that requires a particular curved surface whose height is critical.

For economy in production, an eight-station progressive die shown in Fig. 5, is used. Coiled 1¾x0.025-in. cold rolled C-1010 steel of No. 3

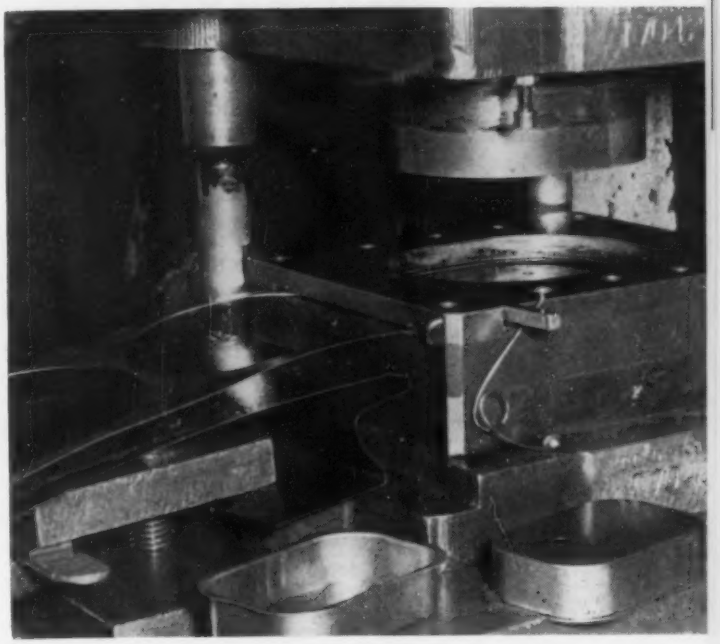

FIG. 3—Die used in stamping 8-mm movie film magazine.

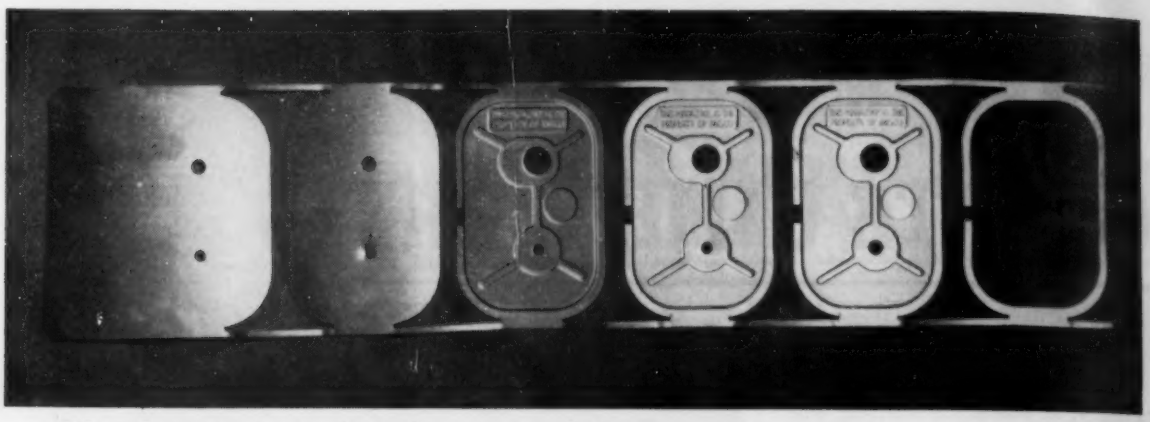

FIG. 4—Progressive die strip showing how cover is made for 8-mm movie film magazine shown in Fig. 3.

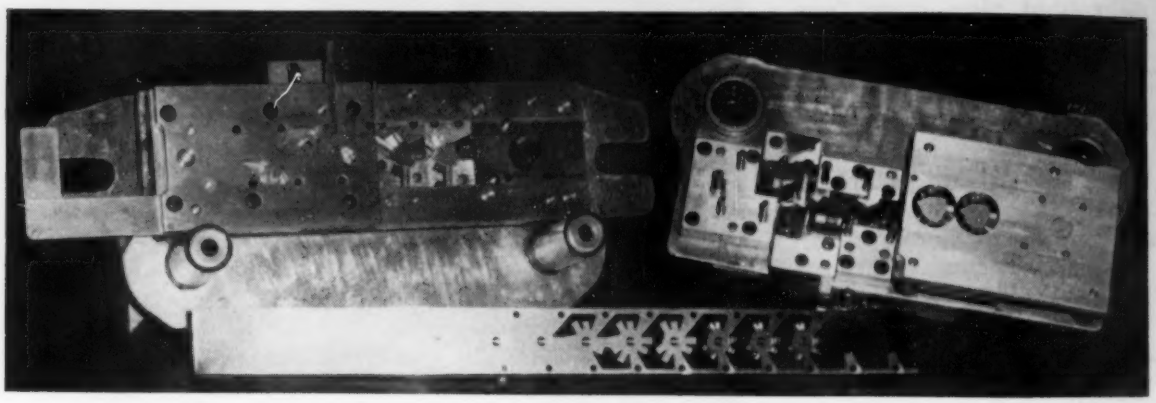

FIG. 5—Die and strip from die used in producing cam lock, an intricate part used in an Ansco camera.

Camera stampings (continued)

temper is employed. It is indexed by hand 1.218 in. before each working stroke, the indexing being from holes pierced in the strip edges at the first station at the same time that the bridged center hole is pierced. Other piercing is done at the three following stations to produce the desired tab contour. First forming occurs at the fifth station and the tab radii are set in a restrike at the sixth station. The seventh station is blank and, at the eighth is finish shear.

NEW BOOKS

"Incentive Management," by James F. Lincoln, relates a successful businessman's philosophy of human relations in business and industry. Incentive methods in themselves are not unique but their application at Lincoln Electric Co. are. The policies and records of this firm, which, under the author's guidance rose from bankruptcy to a position of leadership in its field, challenge currently accepted "solutions" for labor-management-wage problems. In Mr. Lincoln's concept of incentive management all who contribute to business, including the customer, benefit to an usual degree. Lincoln workers are the highest paid in the world. Their average annual wage almost doubles that for the industry. The pride they display in work, homes and community reflects the sense of achievement which is theirs. The Lincoln Electric Co., Cleveland 17. $1.00. 280 p.

"A Treatise On Milling and Milling Machines," third edition, brings up to date an authoritative text on milling practice. The text and over 700 illustrations cover the functions and operations of a variety of machines, attachments, cutting tools, technical data, practical applications of toolroom milling and die sinking, and principles of fixture design. Written for shops, and technical and engineering schools, the book is a valuable text and reference. The Cincinnati Milling Machine Co., Cincinnati 9. $8.00. 910-p.

"Carbide Cutting Tools, How to Make and Use Them," by Warren Baker and Joseph S. Kozacka. A wealth of practical information on design, manufacture and use of carbide as a cutting edge is presented in this new text. Much of the material is based on original research. Other subject matter has heretofore been available only in technical and engineering journals. American Technical Society, Drexel Ave. at 58th St., Chicago 37. $5.50. 416 p.

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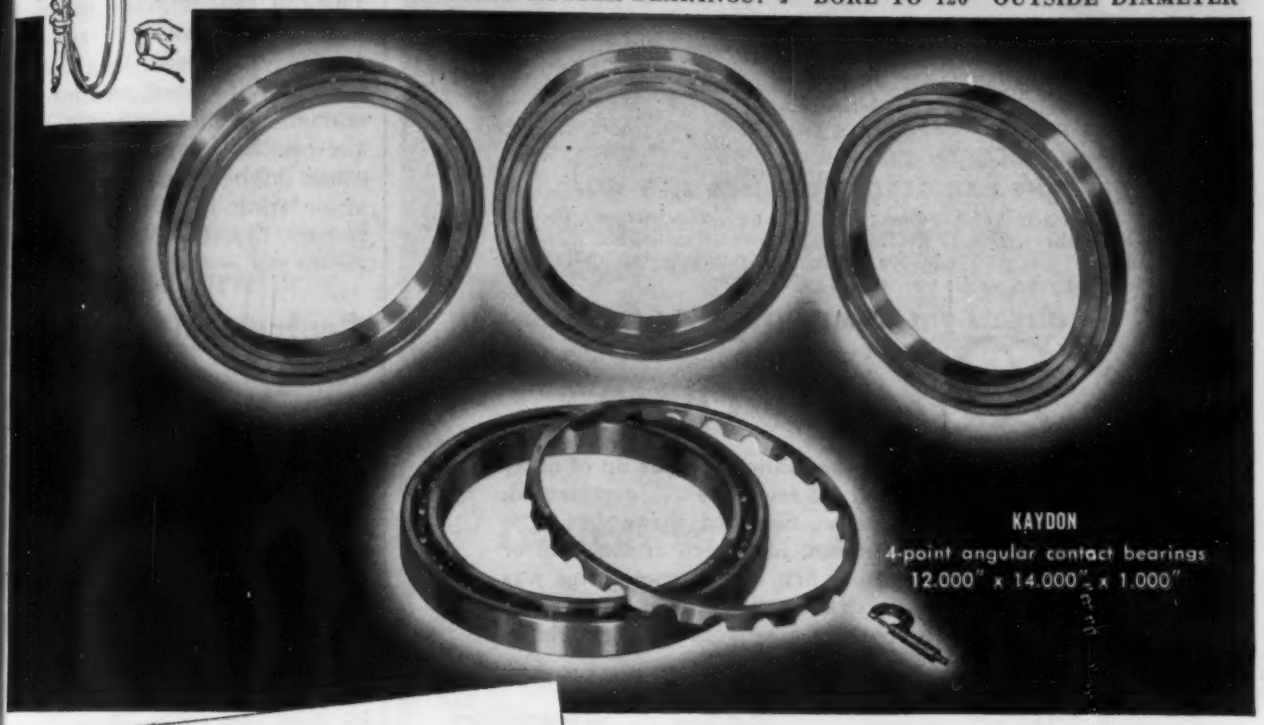

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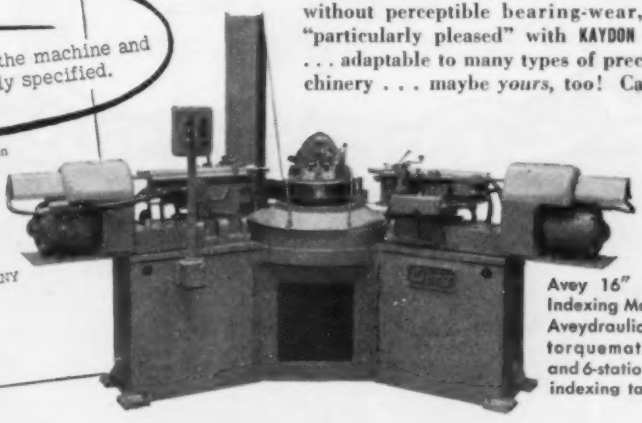

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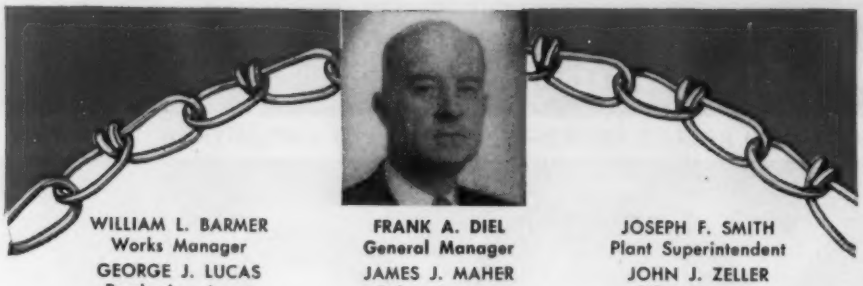

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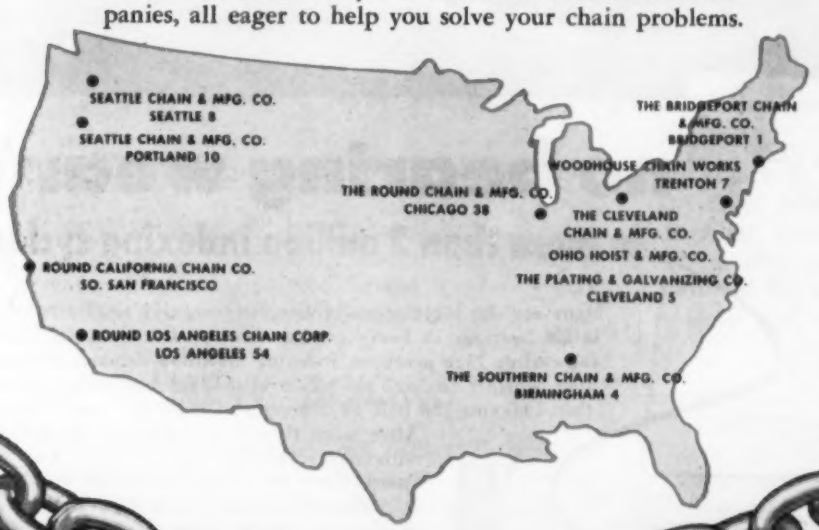

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The full line of Standard Specific taps is described in a new 32-p. catalog. Taps have been designed specifically for steel, cast iron, aluminum, zinc die cast metals, brass, and plastics. Taps are of chrome-cobalt high speed steel. Methods of ordering have been simplified. *Detroit Tap & Tool Co.*

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Centrifugal blowers

Construction features of multi-stage Type V centrifugal blowers for equivalent air pressures above 6.5 psig and inlet volumes above 1500 cfm are described in a new bulletin. Illustrations include a complete cross-section of a multi-stage Type V gas exhauster. *Allis-Chalmers Mfg. Co.*

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Small size tubes

A new 4-p. catalog describes seamless tubing available in sizes from 0.010 in. OD to 5/8 in. OD in metal of almost any analysis. "Pointer" tubing, some of it finer than a human hair, a product specialty, is used for indicating needles in measuring instruments. *Uniform Tubes.*

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Power press brakes

Production-proved power press brakes in capacities from 120 to 1000 tons are described in a new 8-p. bulletin. The brakes are capable of forming mild steel from 3/16 in. to 1 in. in thickness and up to 20 ft in length. Advanced design and sound engineering have been incorporated in the units. *Columbia Machinery & Engineering Co.*

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Load handling

A new certified job study based on operations in a leading transfer terminal has been prepared. Loading time per trailer was cut 50 pct, breakage of goods, 90 pct with new methods and equipment. *Towmotor Corp.*

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Electrode directory

A new 16-p. "1952 Directory" of electrodes and welding alloys contains data and technical information on a series of "Eutectic Low Temperature Welding Alloys." These are designed for use with cast iron or steel, nonferrous metals, hard and machinable overlays and for metal cutting. *Eutectic Welding Alloys Corp.*

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Magnetic separator

Jeffrey drum type magnetic separators offer advantages of extreme simplicity. A new 8-p. bulletin describes the separators. Electromagnets within the drum are located on a hollow, stationary shaft on which the drum rotates. Wiring enters the drum through the hollow shaft. *Jeffrey Mfg. Co.*

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Flexible shafting

A comprehensive 256-p. reference manual provides an authoritative picture of the range and scope of flexible shafts in transmitting power and remote control. Full details on construction, selection and application are carried. The edition covers changes and developments since 1944. *Available to those who address inquiries to this column on company letterhead. S. S. White Industrial Div.*

Fans and blowers

A wide range of ventilating fans, air circulators, belt driven exhaust fans and other fans for office, home and industry are described in a new 24-p. catalog. Features include rubber mountings, lifetime lubrication and balanced blades. *Standard Electric Mfg. Co.*

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Machining copper alloys

A 32-p. booklet suggesting cutting speeds, feeds, tool rakes and clearances to be used on more than 42 different copper alloys has been prepared. Based on the use of standard cutting tool materials, the booklet contains many helpful and practical suggestions on turning and cutting operations. Also included are tables of technical data. *Anaconda Copper Mining Co.*

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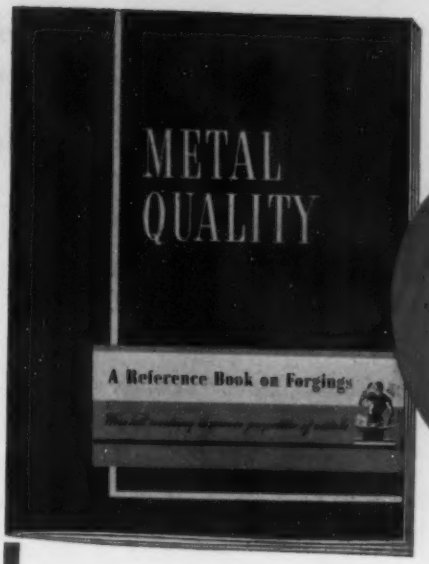

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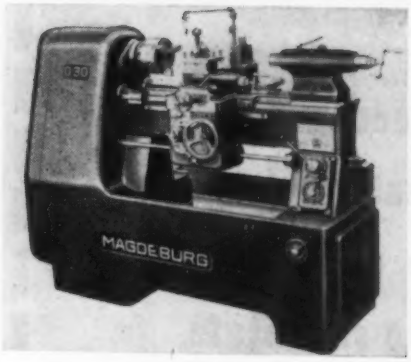
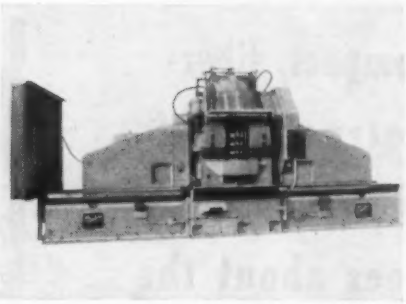


Lathe handles fine finishing, volume runs

Simpler in design and comprising fewer parts than most lathes, the West-German Magdeburg D-30 center lathe provides a high degree of precision for superfinishing work and volume runs. Operation is simple: one lever controls forward and reverse rotation, speeds and braking of spindle. A second lever gives a choice of four longitudinal and four facing feeds. Spindle housing and bed are cast in one part. Speeds range from 300 to 3000 rpm. Steel with tensile strengths up to 110,000 psi can be cut successfully to a depth of 0.158 in., or a diameter of 0.0316 in. with a feed of 0.0004 in. Tolerances from +0 to +0.004 in. can be maintained without difficulty. *Kurt Orban Co.*

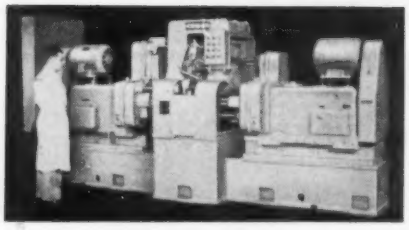
For more data insert No. 25 on postpard p. 97



Trunnion machine processes valve rocker arms

Extreme rigidity in central section and safety through automatic shut-off devices are the two prime features incorporated in a special three-way trunnion machine with two horizontal 30 in.-way hydraulic units and one 8 in.-way hydraulic unit. It was designed to process 880 valve rocker arms per hr at 100 pct efficiency. Tooling includes six-station trunnion type fixture loading four parts to a station, with power indexing for the trunnion; a 20-spindle right-hand head, 12-spindle left-hand head and four-spindle rear head. *Buhr Machine Tool Co.*

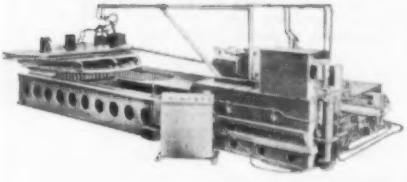
For more data insert No. 26 on postpard p. 97



New machine tool for oil pump bodies

A special machine tool bores, drills, chamfers and reams oil pump bodies. One unskilled operator can produce 95 pieces per hr at 100 pct efficiency. The machine has six stations—one loading and five working. It drills and reams the shaft holes, rough and semi-bores the gear pockets and center counterbore, drills intake hole, drills and chamfers screw holes. *Cross Co.*

For more data insert No. 27 on postpard p. 97



Roller table bending machine cold forms parts

Capable of cold stretch-forming a variety of structurals and sheet metal parts, which conventionally are hot-formed, a roller table bending machine is designed in sizes to handle all types of metal from delicate light cross sections to heavy sections up to 2½ sq-in.-area. Employing a new rack and gear principle, the machine provides variable stretch control. A pull is permitted to the ultimate limit of the part being stretched, without overstretching. *Struthers Wells Corp.*

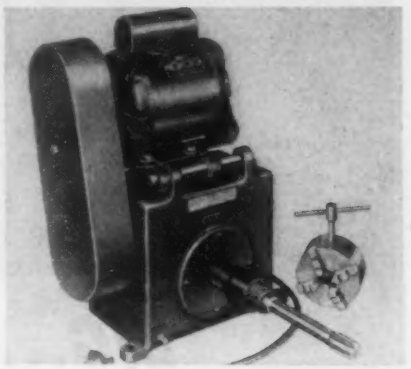
For more data insert No. 28 on postpard p. 97

Box furnace features embedded heating units

Chamber size of 15x12x30 in. extends the capacity of an electric box furnace to handle greater production and larger units of work. The Cooley embedded type heating unit protects the heavy element wire from atmospheric attack. The elements, formed in ceramic slabs, are located in each side, the bottom, top, rear wall and the door of the furnace to give a maximum and uniform distribution of heat. The slab shape elements act as baffle walls. Unrestricted air spaces surround the elements and a natural air convection is created, further equalizing the temperatures. Because of the method used in replacing elements, maintenance cost is at a minimum in the BL furnace. The wall type door moves vertically in response to counter-balanced door operation mechanism. Furnace operates temperatures to 2000°F. *Cooley Electric Mfg. Corp.*

For more data insert No. 29 on postpard p. 97

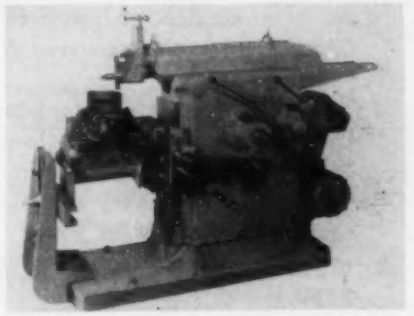
Versatile portable reamer has three speeds



The machine illustrated is said to embody features essential to accurate reaming, chamfering, and can be equipped with tapping head to be used as a high speed horizontal tapping unit and adding to its versatility it is being used as a lapping and honing unit. Output speeds 95, 120, 165 rpm standard can be made 48, 60, 83, 190, 240, 330, 380, 480, 660 rpm. Speed control is through three-step V pulley, easily shifted due to special motor mounting. Reamer capacity up to 1 3/16 in., mandrel bored to No. 3 Morse taper. Motor is 1/3 hp 110-120 v 60 cycle single phase or can be equipped for direct or odd frequency. *Joseph E. Murphy Co.*

For more data insert No. 30 on postpard p. 97

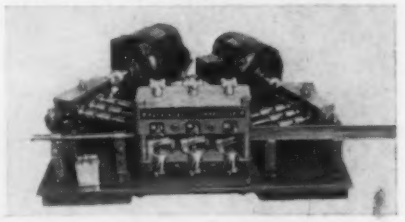
Shaping machine features swinging table



A new low cost high speed floor model shaping machine has 18-in. stroke and 35-in. ram and four speeds varying from 22 to 115 strokes per min. Base and body are heavily cast and are of sturdy construction, internally ribbed to insure maximum rigidity. Automatic horizontal feed motion gives four variations of feed per ram stroke. Drive is from a self-contained motor mounted on an adjustable stool, and is transmitted by three V belts through a matrix multiple-disk friction clutch to a totally enclosed four speed box. *British Industries Corp.*

For more data insert No. 31 on postcard p. 97

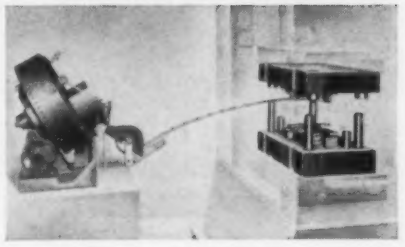
Rotary straightener removes waves, bends



The new rotary straightener has three sets of identically contoured twin cross rolls, all power driven. The middle pair of rolls is adjusted up or down so that the correct amount of offset for good straightening effect is maintained. Tube is straightened by revolving cut lengths of stock spirally through the three sets of cross rolls. *Mackintosh-Hemphill Co.*

For more data insert No. 32 on postcard p. 97

Clinch nuts inserted by conventional dies



New tooling to insert type H clinch nuts simultaneously with other production steps consists of an interchangeable magnetic punch and clinching die button. It becomes a normal piercing station in the die which makes the part. The interchangeable punch and die eliminate extra clinching for clinch nuts and makes them substitutes for welded nuts or tapped holes. Nuts are fed from hopper. *Richard Bros. Div. Allied Products Corp.*

For more data insert No. 33 on postcard p. 97

Turn Page

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ACCO
product
featuring
DUALOC*
BIG . . . or small
• It makes no difference if your load is big or small, light or heavy, rough or smooth. There is an ACCO *Registered* Wire Rope Sling for the job.
You can get standard Strand-Laid and Cable-Laid Slings from local distributors. Many others are carried in factory stock. The big ones and very special ones we design and make specially for you.
Every ACCO *Registered* Wire Rope Sling is proof-tested, identified with a metal tag, and warranted as to rated capacity. We eliminate the guesswork. See your distributor today or write for information.
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Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.
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Slings

Welding fittings

Key-Kast alloy steel welding pipe fittings and flanges are engineered to make them the strongest rather than the weakest part of piping. Advantages to fabricators and users of alloy pipe are: greater wall thickness throughout, with added thickness at all areas of stress; provides greater structural strength and a larger allowance against corrosion and erosion; the line meets ASA, ASME and ASTM standards. Fittings are available in low and intermediate alloys and various types of stainless steel. *Key Co.*

For more data insert No. 34 on postcard p. 97

Pivoted steel window

A new and modern industrial pivoted sash can be used in any type commercial or industrial building. Each sash is bonderized after fabrication and given a baked on prime coat of paint. Sash is made of hot rolled steel sections that are fabricated and fitted to form a sturdy frame. They are made in all standard sizes, as adopted by Metal Window Institute, with push bar, spring latch, or cam latch type operator. Ventilators are hinged on concealed bearing type pivots that are an integral part of the frame. *Steelcraft Mfg. Co.*

For more data insert No. 35 on postcard p. 97

Sub-zero chest

Temperature to −95°F can be reached in a new sub-zero chest, designed for industrial processing. Shrink fits, seasoning gages, and precision tools, and testing metals and materials at sub-zero temperature are applications. The cabinet is available in two sizes and is equipped with sub-lid to maintain constant temperature throughout storage compartment and to minimize heat loss during usage. Temperature control is adjustable for any controlled temperature to −90°F in the 1.5 cu ft model in normal room temperature; controlled to −80°F in the 6.5 cu ft model. *Revco, Inc.*

For more data insert No. 36 on postcard p. 97

Molding compound

A new formulation of Parker's synthetic rubber O ring molding Compound 90 supplies properties that exceed the requirements of Army Ordnance Specification AXS 1440, Class A. This elastomer is being used in O ring seals for tanks and military vehicles, and is marked by superior heat resistance (to 225°F), low compression set, and high hardness. It is particularly useful in difficult high pressure applications involving oil resistance. Tensile strength of Compound 90 is 1450 psi; elongation is 210, with a 150 value after aging. Hardness is Shore 90 unaffected by aging. *Parker Appliance Co.*

For more data insert No. 37 on postcard p. 97

Labeling tape

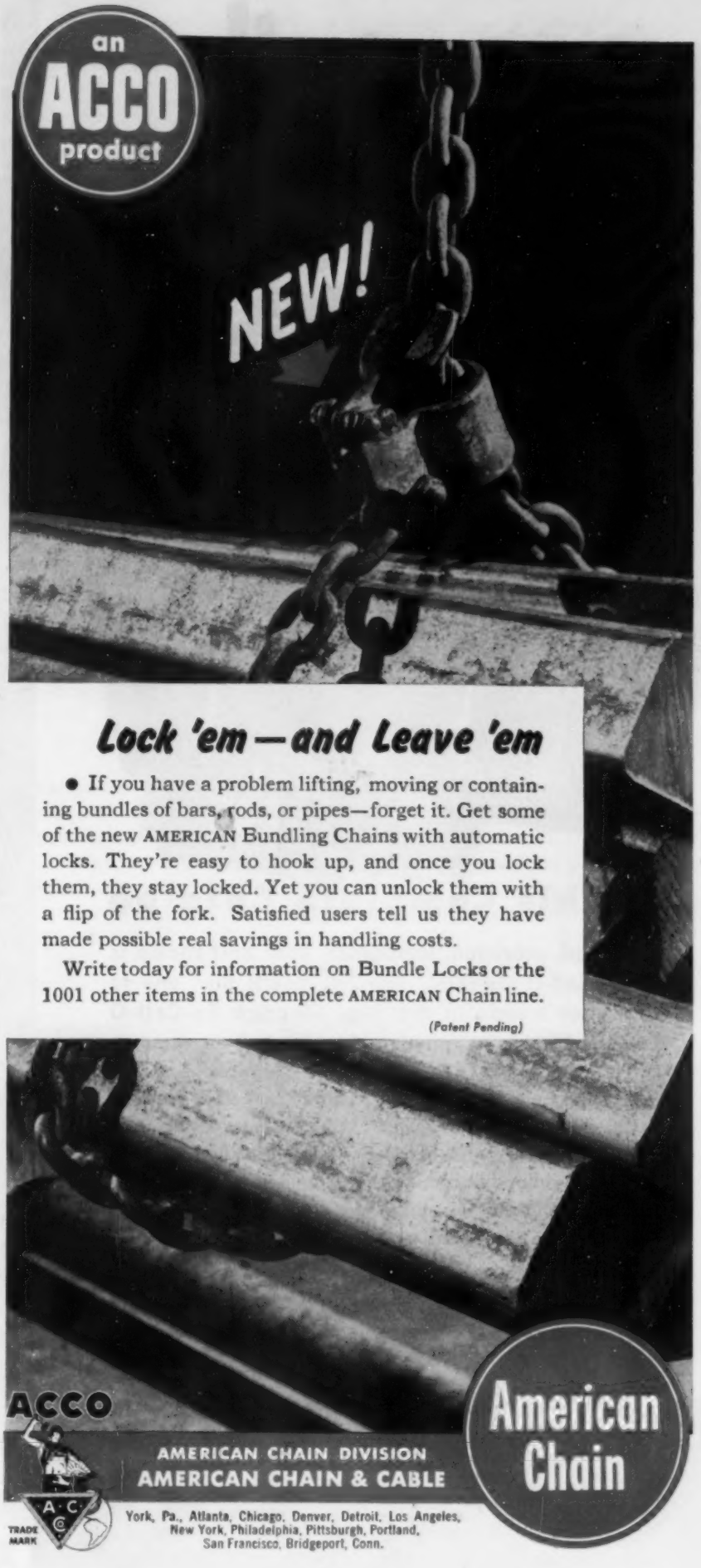
Labelon tape, a pressure-sensitive labeling tape on which you can write and which becomes a waterproof, oil-proof, and smudge-proo label, is available in four colors seven widths, and two roll lengths. Pencil, stylus, or other blunt instrument is used. The adhesive which requires no moistening adheres readily to almost any hard surface, and can be transferred from one surface to another. *Labelon Tape Co.*

For more data insert No. 38 on postcard p. 97

Nonferrous tester

For the exclusive use of nonferrous material, a pocket size on-the-job surface hardness testing instrument weighs less than 5 oz and measures under 5 in. long. It has been perfected for testing surface hardness of nonferrous extrusions, castings, machined parts and fabrications. Outstanding features include direct reading scales, one incorporated accurately correlated numerical equivalents of the Brinell 500 kg 10 mm ball testing equipment and the Metalometer Scale which is graduated numerically in 100 equal divisions and is used as a comparator for accepted nonferrous master specimens. *Peabody Industries.*

For more data insert No. 39 on postcard p. 97



Lock 'em—and Leave 'em

• If you have a problem lifting, moving or containing bundles of bars, rods, or pipes—forget it. Get some of the new AMERICAN Bundling Chains with automatic locks. They're easy to hook up, and once you lock them, they stay locked. Yet you can unlock them with a flip of the fork. Satisfied users tell us they have made possible real savings in handling costs.

Write today for information on Bundle Locks or the 1001 other items in the complete AMERICAN Chain line.

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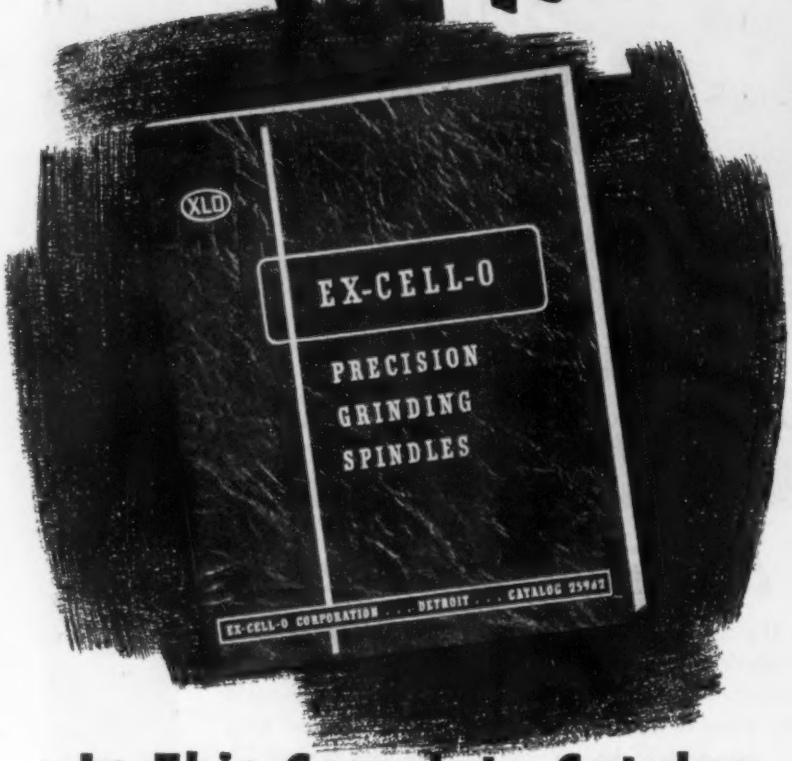
American Chain

The Spindle You Want



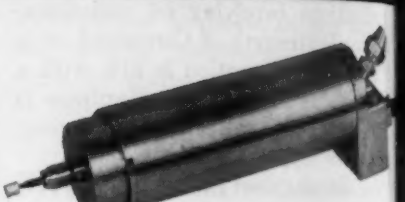
In This Complete Catalog

For speed, precision, endurance, your best choice is an Ex-Cell-O Grinding Spindle. You'll find one to suit your needs in the big, 80-page Ex-Cell-O Catalog 25962, supplied with price list on request.

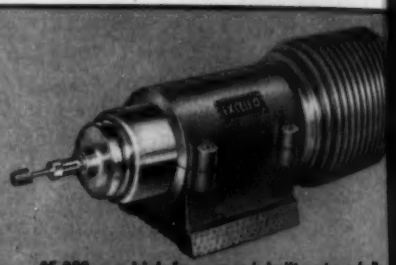
● Leading grinder manufacturers install Ex-Cell-O Precision Spindles as original equipment. You can improve the performance of your grinders with Ex-Cell-O Precision Spindles. They are rigid and smooth-running, permit heavy cuts without chatter, require no lubrication or adjustment. All are fitted with precision ball bearings manufactured by Ex-Cell-O.

Single-body, belt-driven internal grinding spindle.

Double-body, belt-driven internal grinding spindle.

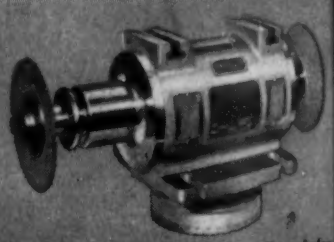


65,000 rpm high frequency inbuilt motor spindle.



25,000 rpm high frequency inbuilt motor spindle.

Totally enclosed inbuilt motor surface grinder spindle.



Precision inbuilt motor spindle for cutter grinder.

Vertical precision spindle with inbuilt motor.

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New Strike Crisis Will Haunt Steel Industry

USWA's 45-day truce furnishes only a breather . . . Union speakers hurl sarcasm, invective at industry leaders . . . Government to play active role . . . Expect easing of some items.

The 45-day steel-labor truce does not end the threat of a steel strike. Another grave crisis will confront the industry by Feb. 21 when the truce expires. Recommendations of the Wage Stabilization Board (hearings began this week) are expected to be made public before that time.

Neither union nor management is bound to accept WSB recommendations. But union cockiness at its million dollar convention in Atlantic City last week indicated confidence that WSB findings would not be unacceptable—at least to them. The union had won a moral victory in forcing a personal stay-at-work plea from President Truman, and getting its case before a special panel.

The Record—The same thing happened in 1949. On that occasion recommendations of the Presidential panel were accepted by labor. And, when management found them unacceptable and rejected them, a month-long strike costing over 10 million tons of steel output resulted. In the end, the union won noncontributory pensions and steel prices were raised an average of $4 a ton.

In 1950 an amicable settlement was reached. Steelworkers' wages were raised an average of 16¢ an hr, and steel prices went up an average of $5.88 a ton.

A look at the record makes it obvious why companies are balking at increasing wages without prices. Yet the union is demanding a flat raise of 15¢ an hr, plus 3½¢ more for job classifications, plus many fringe concessions. The total 22-point package would cost about 50¢ an hr. Without a compensating price rise, this burden cannot be met, the steel industry believes.

Three-Way Street—The union convention in Atlantic City turned into a full-fledged war council. More than 14 years of collective bargaining have left management and labor poles apart. Now labor is angry. In addition to drum beating, dripping sarcasm and loud invective hurled at steel leaders were products of the 3-day meeting.

Arbitration will now be conducted on a three-way street, with the government playing an active role. Belief persists that agreement can only be reached through active participation of Administration officials. Final decision on any "deal" rests squarely with the White House.

Openhearths Down—For at least the next 6 weeks continuing steel production will be a highly uncertain business. As if labor trouble were not enough—scrap supplies, which had been touch and go, have suddenly taken a turn for the worse. Everyone interested in steel production was shocked by the news that U. S. Steel had been forced to take eight openhearth furnaces out of operation—five at Pittsburgh and three at Gary, Indiana. Daily production loss will be more than 1500 tons of steel.

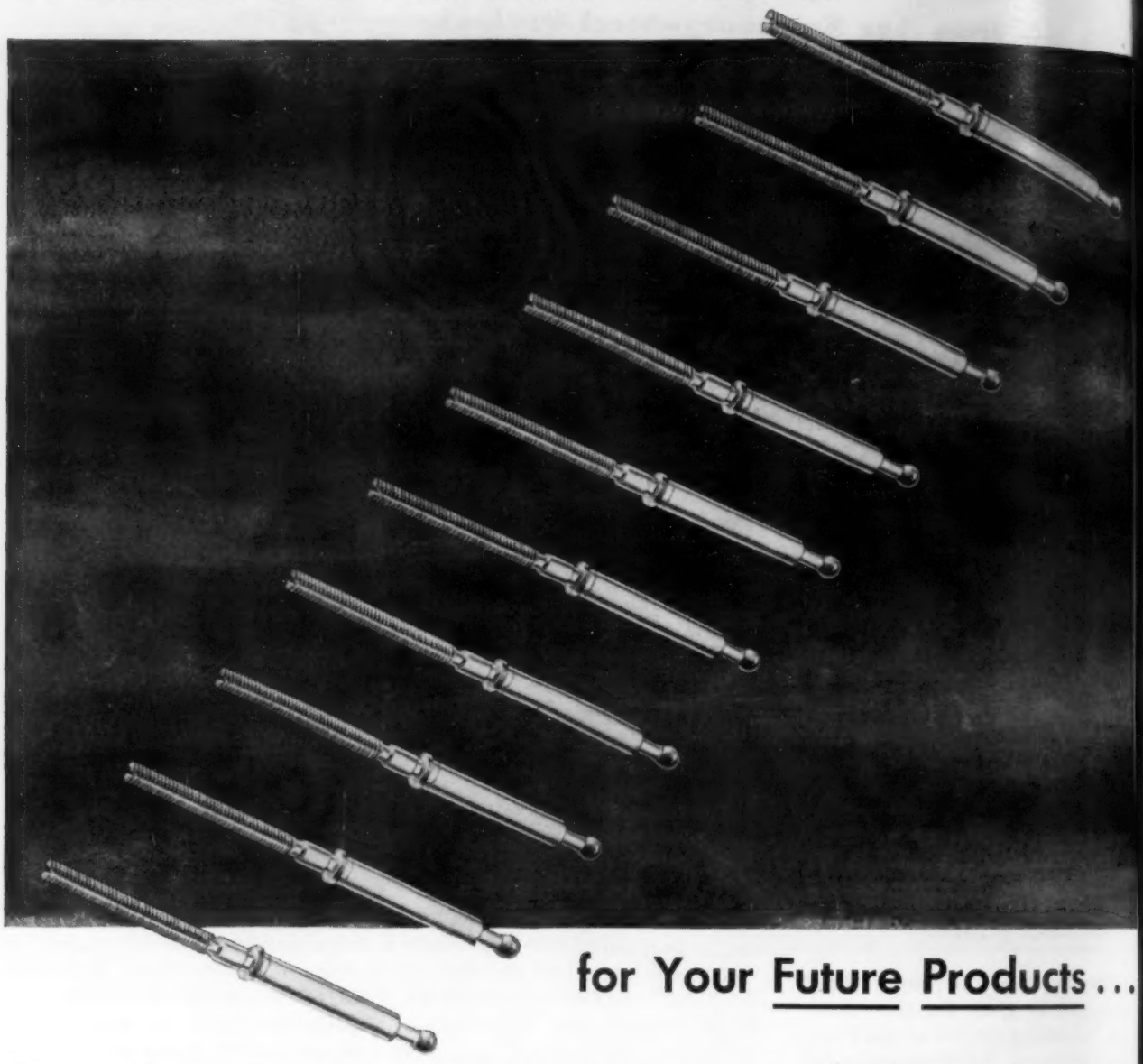
The shutdowns did not come without warning. For the past few weeks U. S. Steel had been able to maintain capacity operation only with the help of scrap borrowed from other mills. Now the corporation's stocks on the ground in Pittsburgh are practically nonexistent—200 tons early this week, compared with daily consumption of 4500 tons. They are now working out of cars. In several important areas scrap collections have fallen more than 50 pct during the past few weeks. King Winter may govern steel production until spring.

Easing Demand—Although evidence on their order books still isn't convincing, mill officials expect easing demand for some products to be noticeable before the end of the second quarter. By the time second quarter order books open, some sales people say they will really have to do some selling on such items as wire rope, mechanical tubing, silicon sheets, cold-rolled sheets and chrome stainless.

The government is putting more pressure on some mills to boost their production of bars (particularly for the shell program), shapes and plates. However, some mills have about reached the limit on the amount they can shift their product-mix to meet these requirements. Even where it is mechanically possible to do so, they point out, other Controlled Materials Plan tickets would be left unhonored.

Ingot Rate Up—Steelmaking operations this week are scheduled at 102 pct of rated capacity, up half a point from the holiday week. This rate is based on 1951 capacity of 104,229,650 net tons. It will be revised downward when 1952 capacity of about 107 million tons is announced in a few weeks. This year new capacity is scheduled to be brought in at a rate of almost a million tons a month. But its full utilization will depend on labor peace and a more plentiful scrap supply.

A Stainless Job That Points to Success



for Your Future Products . . .

When your talk gets around to Stainless for your own future products, this Stainless job points the way to giving you extra advantages. It shows why it pays to consider Carpenter for Stainless that will do the unusual.

Take a second look at this job, for example. Tolerances were close, and had to be "on the nose" every time. Finishes had to be "perfect", to insure accurate operation. And like all other precision jobs, the parts had to be produced with minimum rejects.

In today's planning for the future, if you have the problem of recommending a Stainless that will give you something extra in performance or in production, it's a good idea to call Carpenter. Put Carpenter's experience with Stainless to work on *your* jobs.

Helping engineers get improved or unusual results with Stainless is our favorite job. From the time the first free-machining Stainless was invented in Carpenter's laboratories, we have been developing new Stainless Steels and improving old ones. They are described in "Working Data for Carpenter Stainless Steels". Let us know if you would like a personal copy.

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
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DON'T WAIT... COOPERATE!
The U.S. Needs Your Steel Scrap, Now

Carpenter
more than corrosion resistance
STAINLESS STEEL
takes the problems out of production

Market Briefs

buys site — Allegheny Ludlum Steel Corp. has bought a 160-acre industrial site on the west bank of the Allegheny River three miles north of Freeport, Pa., for future expansion. The site is 12 miles from the company's Brackenridge, Pa., plant and easily available to its West Leechburg plant. No immediate use of the site is contemplated. Company properties at Brackenridge and West Leechburg are almost completely occupied.

request denied — U. S. Tariff Commission has dismissed the application by screw manufacturers to have import duties increased upward. Action was taken by the commission after an investigation which indicated no public hearing was necessary. Present import duty rate is 15 pct ad valorem, set at the Geneva conference. But this will be reduced to 12½ pct, effective June 1, as a result of a further cut agreed upon at the Torquay trade meeting in England.

price change —J. H. Treanor, vice-president of the Mystic Iron Works, New England's largest producer of pig iron, has notified customers that the base price of foundry pig iron for January, February and March has risen 50 cents from $57.00 to $57.50 per gross ton f.o.b. Everett, Mass., plus current differentials for silicon, phosphorous and manganese. The price of malleable pig iron rose from $57.50 to $58.00.

more freight — Railroads are expecting to haul 10 pct more ore, 5 pct more steel, 8.6 more machinery and boilers, and 6 pct more coal and coke during first-quarter 1952 than in first-quarter 1951. A general carloading increase of 2.2 pct for the quarter is forecast by shipping groups in estimates to the Assn. of American Railroads. This would mean about 7,328,000 carloads leaving the platforms.

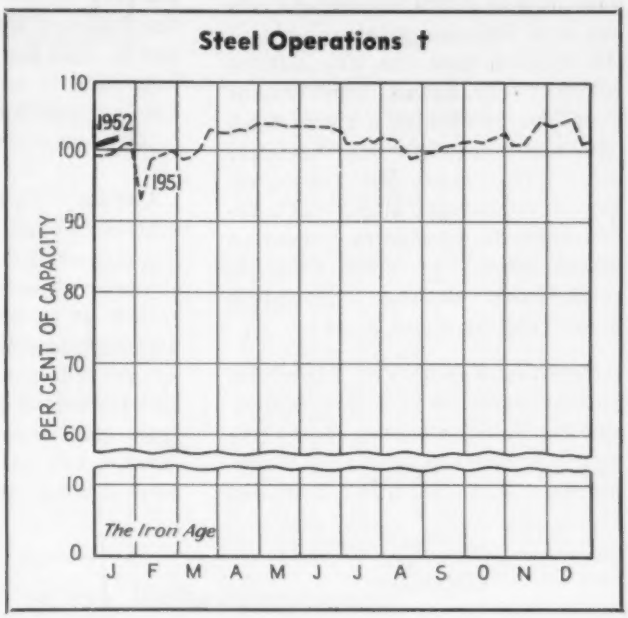
new blower — U. S. Steel Co.'s Youngstown plant will install a third large turbo-blower, which will increase pig iron production by about 220,000 tons yearly. Cost of the new blower and extensions of buildings to house it is estimated at about $2 million.

alumina plant—Reynolds Metals Co. has issued a letter of intent to C. F. Braun & Co., Alhambra, Calif., for the engineering and construction of a $42 million alumina plant in San Patricio County, Tex. The 1000-ton-per-day plant will be built adjacent to the aluminum reduction plant now under construction there. Completion of the alumina plant is expected by January, 1953.

nitrogen — Construction of an additional 500,000 tons of nitrogen production capacity between now and 1955 will head off any probable shortage of the element's products for metal treatment, refrigeration, and other commercial uses. This is the view of the Defense Production Administration, following a survey of the situation. All bets would be off, however, if there were to be an all-out shooting war because demands for explosives and propellants would then zoom upward. Production goal by 1955 is 2,930,000 short tons annually. Of this amount DPA reports that capacity amounting to 2,430,000 tons is already built or authorized. About 670,000 tons in capacity is being built with government assistance.

home grown cranes — While eastern steel mill expansions have been held up by delays in crane shipments, westerners fare better. Ederer Engineering Co. of Seattle has completed a 75-ft crane weighing 90 tons for Bethlehem Pacific Coast Steel Corp.'s Los Angeles plant. It is believed to be the largest built on the Coast. Consolidated Western Steel Div. of U. S. Steel built the cranes for Kaiser's new cold reduction and tin mill at Fontana.

expansion — Large-scale reconstruction is being undertaken by the Boliden Company at its copper works at Ronnskar, Sweden.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Dec. 30	101.0	99.5*	103.0	100.0	102.0	104.0	93.0*	109.0	104.0	108.0	96.0	50.0	103.0	101.5
Jan. 6	97.0	101.5	102.0	101.0	103.0	104.0	98.0	106.0	105.0	104.0	95.5	91.5	113.5	102.0

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,850 net tons.
* Revised.

Tin Supply Tussle Nearing Head

Symington resigns RFC post to relief of world's tin producers . . . Bolivian ambassador meets President on subject . . . Copper fighting aluminum as substitute—*By R. L. Hatschek,*

New developments in the tin situation are taking form rapidly. There is still no inkling of what the official solution to the problem will be but it is almost an absolute certainty that the government will take steps in this direction before the month is over.

Symington Resigns — Tin producers in the Far East have expressed a definite feeling of joy at the news of Stuart Symington's pending resignation as head of the Reconstruction Finance Corp. President Truman has indicated that he will accept the resignation some time later this month.

Prices in both the Singapore and London markets moved slightly upward when word of this development was heard. Both Far Eastern and Bolivian interests are of the opinion that the new administrator will be an improvement over Mr. Symington's rigid stand on the subject of prices. Washington circles expect Mr. Symington to conclude negotiations with Indonesian tin producers before he leaves office. The most probable compromise on the "reasonable price" will be about $1.28.

Bolivian Talks—The price dispute between the U. S. government and the Bolivian tin producers has now reached top levels in Washington. Don Ricardo Martinez Varga, Bolivia's ambassador, last week visited briefly with President Truman. Ambassador Varga gave the President a paper outlining the Bolivian position.

No prices were brought up in the conference and another is to be held, though no specific date was set for it. The Ambassador later said Mr. Truman had assured him that a mutually satisfactory solution to the deadlock would be sought. Secretary of State Dean Acheson also went on record last week as saying that a successful conclusion to U. S.-Bolivian tin negotiations is extremely important to both nations.

But a lot of dickering will be required to settle the difference between RFC's offered $1.12 and the Bolivian asking price of $1.50 per lb. And the decision will have to come soon to prevent the necessity of dipping into the government's strategic stockpile.

Copper Fighting — Year-end statements made by people in the copper industry have heavily stressed objections to the substitution of aluminum for copper. The replacement program, abetted by government production agencies to remove some of the tension from the extremely tight copper market, can easily become permanent in some applications and copper people do not relish losing markets.

The main point brought up by producers of the red metal is that the shortage is not going to be a permanent one—nor is it likely to last as long as National Production Authority predicts. Roger W. Straus, board chairman of American Smelting & Refining Co., anticipates actual copper mine output in 1952 will exceed 1951 by 5 to 10 pct, for instance. A secondary, though equally important, point in the same argument is that increased demand for aluminum by the Air Force will keep that metal in its extremely scarce position at least through 1952.

Cost Stressed—The second point in favor of copper is the high cost of making the switch. This was stressed by Revere Copper & Brass, Inc., chairman James J. Russell, who pointed out the fact that the two metals have their own individual properties and cannot be changed for technical reasons. Mr. Russell also said that, in many cases where the substitution is more possible, the switch could only be achieved over a long period at high capital investment.

Nevertheless, many firms are at least experimenting in this direction and some have already made permanent changeovers. Copper people themselves recognize that some of these substitutions are inevitable and are expanding their operations in aluminum. Outstanding among these are Anaconda Copper Mining Co. with its Kalispell aluminum venture, Bridgeport Brass Co. with the announcement in 1951 that it would enter the aluminum fabrication field, and Revere which is expanding its aluminum fabrication.

Olin Seeks Power—Olin Industries, which Manly Fleischmann would "like to get into the aluminum field," is looking for 80,000 kw of firm and 40,000 kw of interruptible power from Bonneville Power Administration for an aluminum reduction plant. (See p. 65.)

NONFERROUS METAL PRICES

	Jan. 2	Jan. 3	Jan. 4	Jan. 5	Jan. 7	Jan. 8
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03	$1.03	$1.03	....	$1.03	$1.03
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

*Tentative

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.6¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 34.3¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 28, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in, $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ⅛ to 0.311 in., 74¢; ½ to ⅝ in., 67.5¢; 1¼ to 1.749 in., 63¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb.; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks		53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$209 to $212
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.03
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	32.25
No. 315	30.25
88-10-2 ingot	
No. 210	40.00
No. 215	38.50
No. 245	33.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17⅞
Red brass	20½	19⅜
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Maker's Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14¾
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½
Aluminum	
Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	10 —11
Zinc	
New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7
Nickel and Monel	
Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	15¾—16
Battery plates (dry)	10½—11
Batteries, acid free	7 — 7¼
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	21 —22
Siphon tops	48 —50
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stereo. dross	8¾— 9
Electro. dross	7½— 8

Pittsburgh on Brink of Big Steel Loss

Scrap trade at zero hour . . . Winter is ruthless foe, forces collections down . . . Large mill has 200 tons on hand, needs are 4500 tons daily . . . Scrap men did best job possible.

The Pittsburgh steelmakers in their traditionally scrap-minus bailiwick were on the brink of losing substantial steel production. Mill and scrap men long-inured to warding off scrap crises are now meeting the real test.

At press time, U. S. Steel Corp., largest consumer and most vulnerable to the shortage, had shut down five openhearths. More shutdowns threatened to hit, so many more that the first five would have seemed negligible. Only increased allocations by National Production Authority could stem the shutdowns—but allocations can only distribute scrap when it's available. Winter cuts supplies.

Stockpiles at U. S. Steel plants in Pittsburgh had been devastated. These furnaces had been living on borrowed scrap in past weeks. Only a scant 200 tons of scrap was on hand while the daily consumption rate towered to a frightening 4500 tons.

The shortage struck first at the largest but was endangering the operating rates of all. NPA believes in equality of sacrifice. Both steel men and scrap people knew that a harsh winter would play no favorites. Zero hour had come and scrap men queried by THE IRON AGE were not optimistic on a collection pickup in the near future. Thus weather, cutbacks in civilian production lowering the take of industrial scrap held the key to survival of the operating rate.

Daily production loss at Pittsburgh was 1000 tons at press time. At Gary, Ind., the loss was about 500 tons daily with three openhearths down.

The grudging retreat into inventory was the pattern all through the country. Scrap men called on deeper reserves of stamina and ingenuity to avert a critical series of furnace shutdowns. But in the wisdom of long experience, they knew that winter has a cold, cold heart towards scrap.

Next week the Institute of Scrap Iron & Steel will meet in New York. There may be some disheartenment because the big job was not totally completed. But all of the scrap people attending will know that they did and are doing the best job that was humanly possible. America cannot ask for more.

Pittsburgh—The scrap shortage is approaching an all-time low in this district. Major cutbacks in steel production are threatened. U. S. Steel Corp., with five openhearth furnaces already down, early this week was considering more shutdowns. Stockpiles at U. S. Steel plants here were 200 tons compared with daily consumption of 4500 tons. The plants were existing on scrap lifted from freight cars. U. S. Steel has asked NPA for help. Daily production loss was 1000 tons. Other producers in the area were better off only relatively—practically all were losing inventory. One producer reported receipts in the last 2 weeks were off 60 pct.

Chicago—The leading steel producer in the area shut down three openhearth furnaces at Gary. As the week opened inventories hovered around 1 day. Other mills have better inventory but as yet there is no sign of other openhearths being shut down although inventories are reported shrinking.

Philadelphia — The scrap situation here is still bad, though not quite so desperate as in other areas. Mills are pushing for deliveries. The trade has its fingers crossed on the subject of weather—bad weather could stop some openhearths.

New York—SOS signals were flashing from Pittsburgh. But scrap supply in this area was slow. Demand was so far ahead of supply that the race was getting ridiculous. Some scrap men here believe that the rest of the month will show little improvement.

Detroit — The first allocations of dealer scrap are now reported here. With auto production schedules off sharply and more cuts in prospect, the trade feels a sharp decline in receipts. Some say volume of scrap has dropped as much as 50 pct during the past 6 months. Defense scrap generation is taking hold very slowly.

Cleveland — Mills here desperately need scrap but most dealers and brokers report meager inventories. One yard reports 7-day week activity, while another hasn't had a wrecking job for weeks. Outlook is for increased activity during next few weeks. Added production scrap would brighten picture. One mill reports loss of more inventory during first week of January than during all December.

St. Louis—Movement of scrap iron is way down. Scrap is available but winter stops collection and preparation. December railroad offerings topped November's but again weather slowed the movement. Mill stocks are still estimated at from 15 to 20 days.

Birmingham — The heavy melting situation is little changed, with only allocations entering into the district. The holiday slowdown is believed over.

Cincinnati—Receipts have fallen off throughout area. Dealers' lack of scrap has cut back allocations. At Newport, Ky., operations are dangerously digging at 3 to 5-day inventory. Receipts from local and southern dealers drop sharply. At Middletown a 4-day inventory is reported with fear of possible shutdown late this week or early next. Electrics would go first.

Boston—A brisk market in all forms of scrap and cast resumed. Most of the allocations, which were to American Steel & Wire Co. of Worcester, are completed and dealers are awaiting new NPA orders.

Buffalo—Fresh allocation orders for shipments to local mills have been received from NPA by dealers. Two top consumers are benefiting. A third mill also reports supplies low.